0047145

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 167444

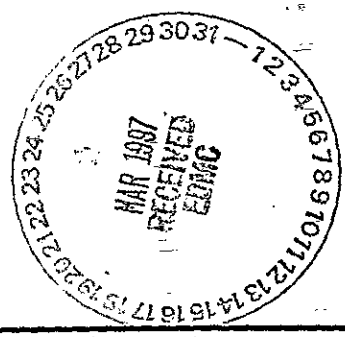
Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.		4. Date
Supplemental [ ] Direct Revision [X] Change ECN [ ] Temporary [ ] Standby [ ] Supersedure [ ] Cancel/Void [ ]	G. J. Carter, 85100, R2-77, 3-2141		06/30/93
	5. Project Title/No./Work Order No. Environmental Restoration	6. Bldg./Sys./Fac. No. 233-S	7. Impact Level 4
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-DD-TI-056 Rev. 0	9. Related ECN No(s). N/A	10. Related PO No. N/A

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condition (Temp. or Standby ECN only)
[ ] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

The document is being revised to identify trade names and their manufacturer. Because of the numerous product names, a total revision is being implemented.



13a. Justification (mark one)							
Criteria Change	[X]	Design Improvement	[ ]	Environmental	[ ]		
As-Found	[ ]	Facilitate Const.	[ ]	Const. Error/Omission	[ ]	Design Error/Omission	[ ]

13b. Justification Details

This document needs to be changed to be released for public reading.

14. Distribution (include name, MSIN, and no. of copies)

See distribution sheet.

RELEASE STAMP

OFFICIAL RELEASE BY WHC (13)

DATE JUL 14 1993

STA-4

A-7900-013-2 (06/92) GEF095

A-7900-013-1 (11/88)

ENGINEERING CHANGE NOTICE	Page 2 of XX2	1. ECN (use no. from pg. 1) 167444

15. *Design* Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]		[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer G. J. Carter G J Carter	6/24/93	PE	
Cog. Mgr. M. A. Mihalic M A Mihalic	7.7.93	QA	
QA		Safety	
Safety		Design	
Security		Environ.	
Environ.		Other	
Projects/Programs			
Tank Waste Remediation System			
Facilities Operations		DEPARTMENT OF ENERGY	
Restoration & Remediation		Signature or Letter No.	
Operations & Support Services			
IRM		ADDITIONAL	
Other			

ORIGINAL

INFORMATION RELEASE REQUEST

References: WHC-CM-3-4

COMPLETE FOR ALL TYPES OF RELEASE

Purpose

- [ ] Speech or Presentation (Check only one suffix)
  - [ ] Full Paper
  - [ ] Summary
  - [ ] Abstract
  - [ ] Visual Aid
- [ ] Speakers Bureau
- [ ] Poster Session
- [ ] Videotape
- [X] Reference
- [ ] Technical Report
- [ ] Thesis or Dissertation
- [ ] Manual
- [ ] Brochure/Flier
- [ ] Software/Database
- [ ] Controlled Database
- [ ] Other

New ID Number: ECN 167444

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Unclassified Category: UC-

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COMPLETE FOR SPEECH OR PRESENTATION

Title of Journal: N/A

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City/State: N/A

Will proceedings be published? [ ] Yes [X] No

Will material be handed out? [ ] Yes [X] No

Title of Conference or Meeting: N/A

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer Name (printed)	Signature	Date
Classification/Unclassified Controlled Nuclear Information	[ ]	[X]			
Patent - General Counsel	[X]	[ ]	SW Bergman	SW Bergman	2/9/92
Legal - General Counsel	[X]	[ ]	SW Bergman	SW Bergman	2/9/92
Applied Technology/Export Controlled Information or International Program	[ ]	[X]			
WHC Program	[X]	[ ]	MC. Hughes	MC Hughes	1/31/92
Communications	[ ]	[X]			
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Publication Services	[X]	[X]	M.K Oldfield	M.K. Oldfield	7/14/93
Other Program	[ ]	[X]			
References Available to Intended Audience	[X] RA	[ ]			
Transmit to DOE-HQ/Office of Scientific and Technical Information	[ ]	[X]			

Information conforms to all applicable requirements. The above information is certified to be correct.

Author/Requestor (Printed/Signature) Date

M. R. MORTON

MR Morton 1/20/92

Responsible Manager (Printed/Signature) Date

G. E. VAN SICKLE

1/20/92

Intended Audience

[ ] Internal [ ] Sponsor [X] External

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APPROVED FOR RELEASE OFFICIAL DOCUMENT KMB 7/14/93

Date Received 1/20/93 KMB

SUPPORTING DOCUMENT

1. Total Pages 239

2. Title	3. Number	4. Rev No.
233-S Facility Potential Chemical Hazards	WHC-SD-DD-TI-056	1

5. Key Words

233-S, Chemical historically

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6. Author

Name: G. J. Carter

G J Carter
Signature

Organization/Charge Code 85100/UE24B

7. Abstract

This report identifies chemicals that were historically used in the 233-S Facility located in the 200 West Area. It must be emphasized that the chemicals historically used in this facility do not represent the current chemical inventory. When available, the Material Safety Data Sheets (MSDS) were provided for each of the identified chemicals.

8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

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9. Impact Level 4

10. RELEASE STAMP

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DATE JUL 14 1993
STA 4
13

RECORD OF REVISION	(1) Document Number WHC-SD-DD-TI-056	Page 1

(2) Title
233-S Facility Potential Chemical Hazards

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) EDT 121810 10/2/90		
		G.J. Carter	M. A. Mihalic 7-7-93
1 RS	The document is being revised to identify		
	trade names and their manufacturer.		
	Because of the numerous product names, a		
	total revision is being implemented.		
	• Implementing these changes per ECN 167444.		

233-S FACILITY
POTENTIAL CHEMICAL HAZARDS

J. E. Cummings, Senior Engineer
G. J. Carter, Jr., Senior Engineer
Decommissioning Engineering

November 10, 1992

Westinghouse Hanford Company
P. O. Box 1970
Richland, Washington 99352

EXECUTIVE SUMMARY

This report identifies chemicals that were historically used in the 233-S Facility located in the 200 West Area. It must be emphasized that the chemicals historically used in this facility do not represent the current chemical inventory. When available, the Material Safety Data Sheets were provided for each of the identified chemicals.

The following are considered to be hazardous within specified concentrations. Sampling is recommended to verify the absence of these products.

- **Ferrous sulfamate**
- **Hexone**
- **Nitric acid**
- **Resin**
- **Sodium nitrite**

The following are considered to be hazardous within specified concentrations if they contain hazardous pigments or are lead based. Sampling is recommended to confirm the absence of this product.

- **Paint (loose or fixed)**
- **Aqualoid (or Acryloid) 15-93 Strippable Coating**[1]

[1]Aqualoid 15-93 Strippable Coating is a trade name of Essex Specialty Products Inc.

- DuPont D-1000[5]
- Klenobowl[6]
- Mineral oil
- Ozone
- Paint stripper
- Radiacwash[7]
- Strip coat
- Trisodium phosphate (TSP)
- Turco WO-2[8]
- Turco Decon 4306-C[9]
- Turco Decon 4306-D[10]
- Turco Contam-Affix[11]
- Wedac[12]

[5]Dupont D-1000 is a trade name of E. I. du Pont de Nemours & Company.

[6]Klenobowl is a trade name of Penelone Corporation.

[7]Radiacwash is a trade name of Atomic Products Corporation.

[8]Turco WO-2 is a trade name of Turco Products, Incorporated.

[9]Turco-Decon 4306-C is a trade name of Turco Products, Incorporated.

[10]Turco Decon 4306-D is a trade name of Turco Products, Incorporated.

[11]Turco Contam-Affix is a trade name of Turco Products, Incorporated.

[12]Wedac is a trade name of West Chemical Products, Incorporated.

- Ions of:
  - Aluminum
  - Iron
  - Chromium
  - Sodium
  - Sulfuric
  - Calcium
  - Magnesium
  - Chlorine
- Ozone

This identification of chemicals historically used in this facility provides a basis for future chemical characterization prior to initiation of actual decommissioning. It is recommended that future chemical characterization include chemical sampling and analysis, visual inspection, and assignment of the appropriate hazardous category based on the resultant analysis and inspection.

CONTENTS

LIST OF FIGURES

ABBREVIATIONS, ACRONYMS, AND INITIALISMS

CAM	continuous air monitor
D&D	decontamination and decommissioning
FY	fiscal year
HEHF	Hanford Environmental Health Foundation
HEPA	high efficiency particulate air
MSDS	Material Safety Data Sheet
PCB	polychlorinated biphenols
ppm	parts per million
PR	product removal
REDOX	reduction oxidation
RM	radiation monitor
SWP	special work permit
TSP	trisodium phosphate
UNH	uranyl nitrate hexahydrate or uranyl nitrate in hexone

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233-S FACILITY POTENTIAL CHEMICAL HAZARDS

1. INTRODUCTION

The purpose of this report is to review the history of the 233-S facility for any chemical constituents that may potentially remain in the facility. A timeline for this facility was developed to provide an orderly sequence of events, equipment history, and chemicals used. A historical review of the types of chemicals and equipment used in the facility provided the basis for this report. This information will be used to support future decommissioning of this facility.

2. DESCRIPTION

The 233-S Plutonium Concentration Facility is located on the north side of the Reduction Oxidation (REDOX) Plant in the 200 West Area. Sketches of the facility are shown on Figures 1 and 2.

3. HISTORICAL TIMELINE

A timeline of the sequences of events for this facility was generated and is provided in this section. The timeline provides historical information regarding the sequence for events that occurred, the history of the equipment, and the chemicals that were used.

Some of the information presented in the timeline does not directly relate to the chemicals used in this facility; however, all information for the timeline has been included because a historical sequence of events for this facility can be an extremely valuable source of information.

3.1. 233-S FACILITY BUILT (1954-55) (Leach 1955)

Project CA-535 (REDOX Phase II Expansion - 233-S Building) provided a new building (233-S) for the concentration of plutonium solutions for shipment to the metal fabrication area.

3.2. PLUTONIUM NITRATE PROCESS INITIATED (March 1955) (Leach 1955)

Initiation of concentration of plutonium nitrate solutions started. See Figure 3, 233-S Plutonium Schematic Flow Diagram.

Figure 1. Floor Plan of 233-S Building.

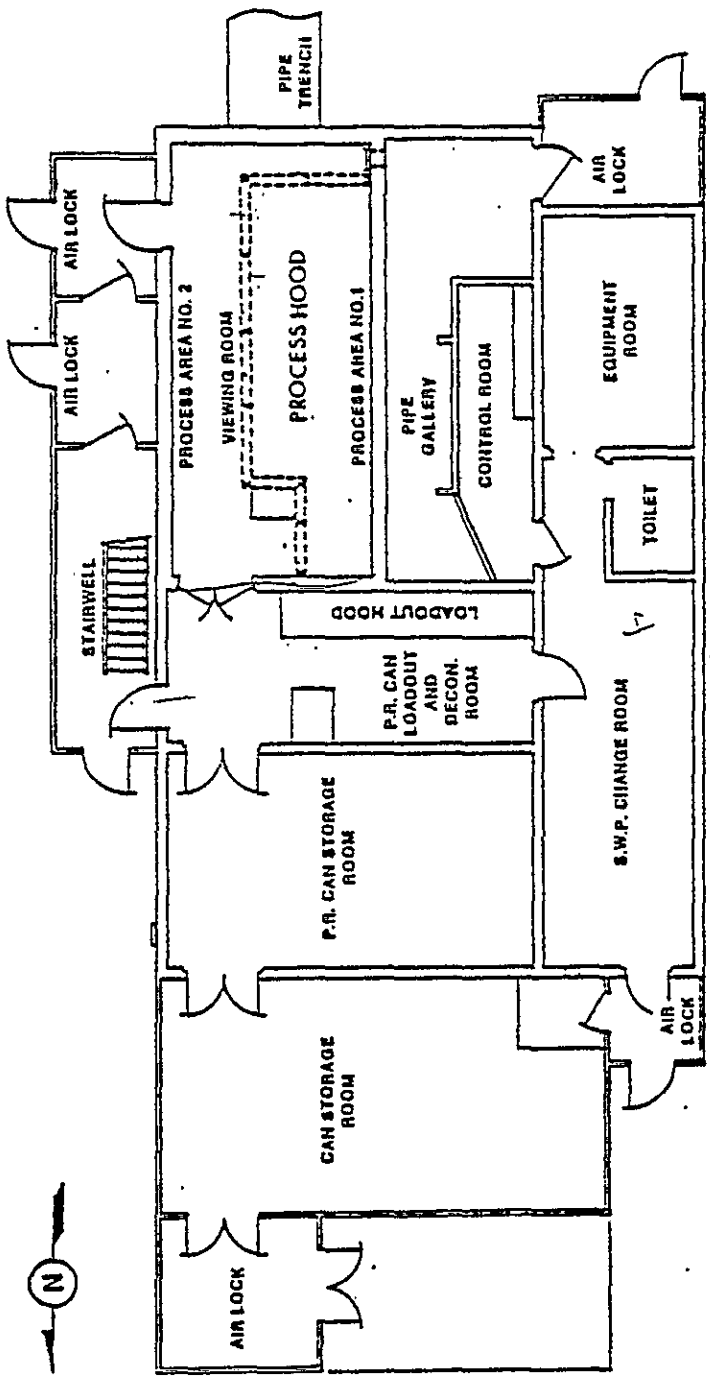


Figure 2. Isometric View of 233-S.

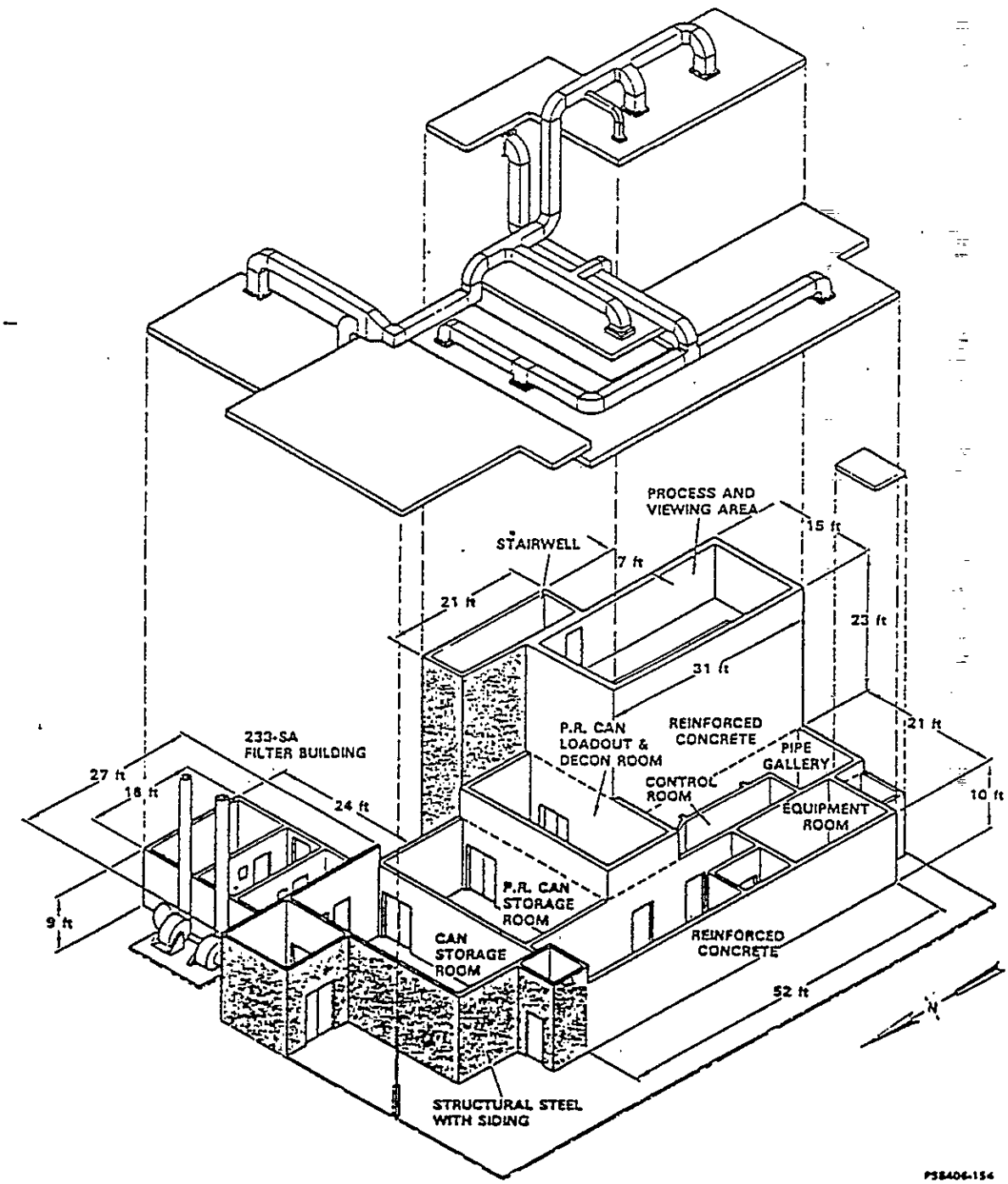
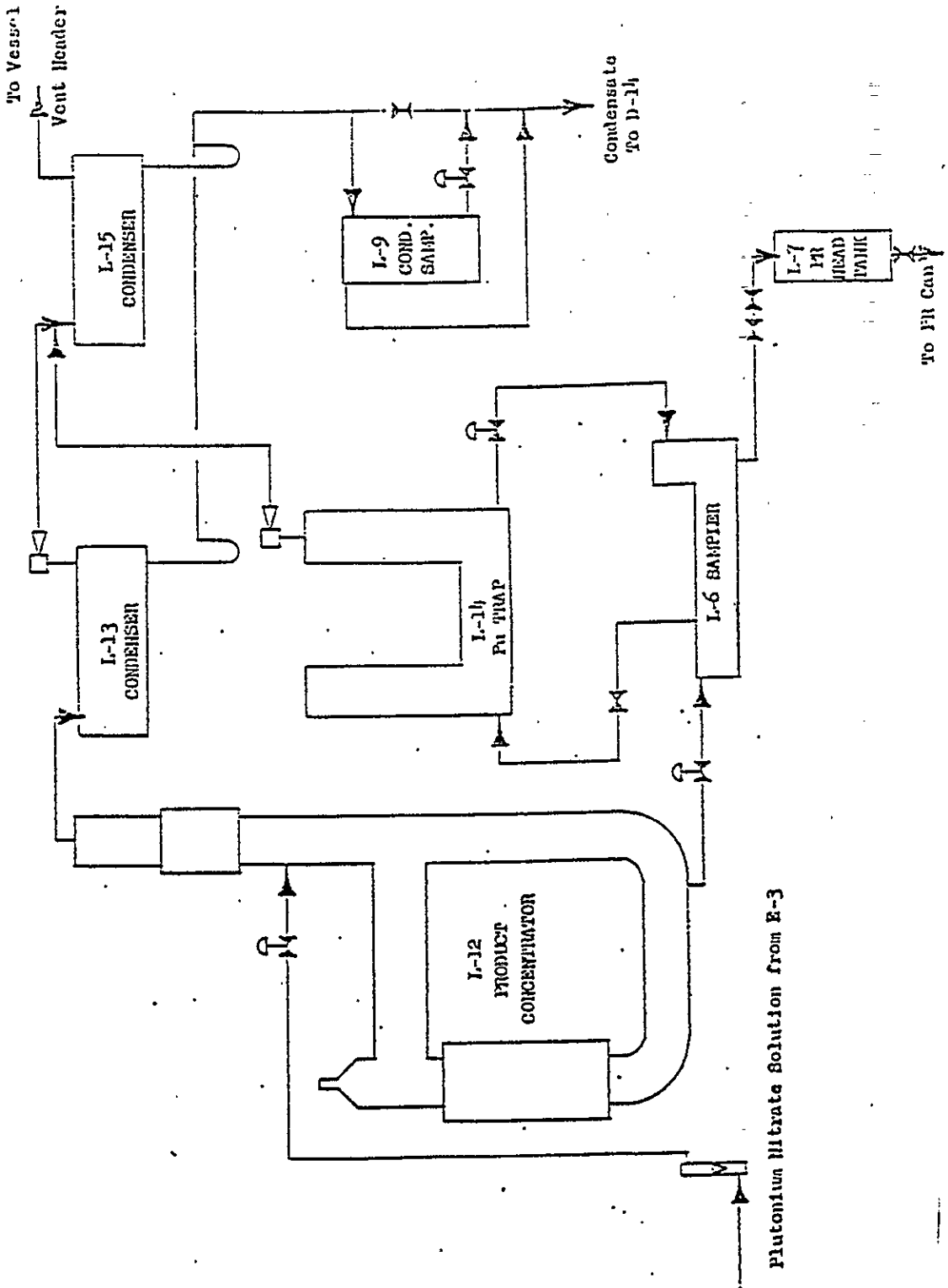


Figure 3. 233-S Plutonium Schematic Flow Diagram.



The operating gallery (control room) contained the controls for the equipment in the process hood and the wash solution makeup tank, L-1-A. The loadout room contained a loadout and decontamination hood for the "new system" product removal (PR) cans and a recycle hood for unloading the "old style" PR cans. The sample hoods for the sump, recycle tank (L-16), and product sampler tank (L-6) were also located in the loadout room. The sample hood for the condensate sampler (L-9) was in the instrument loft.

Plutonium solution was transferred to L-1 under batch control from E-3. The constituents in the plutonium solution were not stated in the records. The solution was fed to L-2 by pump or jet where the hexone was stripped and 5 to 35 percent of the concentration was achieved. The overflow from L-2 was concentrated in L-3 to obtain the desired plutonium content and nitric acid concentration. The concentrated solution was drained from L-3 to L-4 at a controlled rate and was cooled in L-4 for vacuum transfer to L-6. L-14 was the vacuum tank or transfer trap. L-5 was a micrometallic filter for removal of precipitated aluminum compounds or other solids. At that time, the L-5 filter was considered the strongest radioactive source in the building. The product solution was then agitated in L-6 by recirculation using the L-6 pump and was then sampled. Based on the results of the sample, the volume to be loaded into each can was then computed. L-7 was used to measure this volume.

The overhead vapor from L-3 was condensed in L-11 and the condensate then flowed to L-12 for re-evaporation. Any entrained plutonium or nitric acid which was boiled off from L-3 was concentrated in L-12 and returned to L-3 for recovery of the plutonium. The vapors from L-2 were condensed in L-8 and those from L-12 were condensed in L-13. The steam used in the condenser vent jet and the L-14 vacuum jet was condensed in L-15. The condensate from L-8, L-12, and L-15 were drained into a common header with a diversion loop to L-10. A valve controlled by a cycle timer permitted a portion of the condensate to flow from this header to L-9 where it could by sampled. A valve controlled by a valve switch permitted draining L-9 to L-10, and a valve controlled by a valve switch permitted draining L-10 to D-5. L-16 received recycle from the recycle hood for delivery to H-4.

3.3. METAL STORAGE FACILITY BUILT (1957)

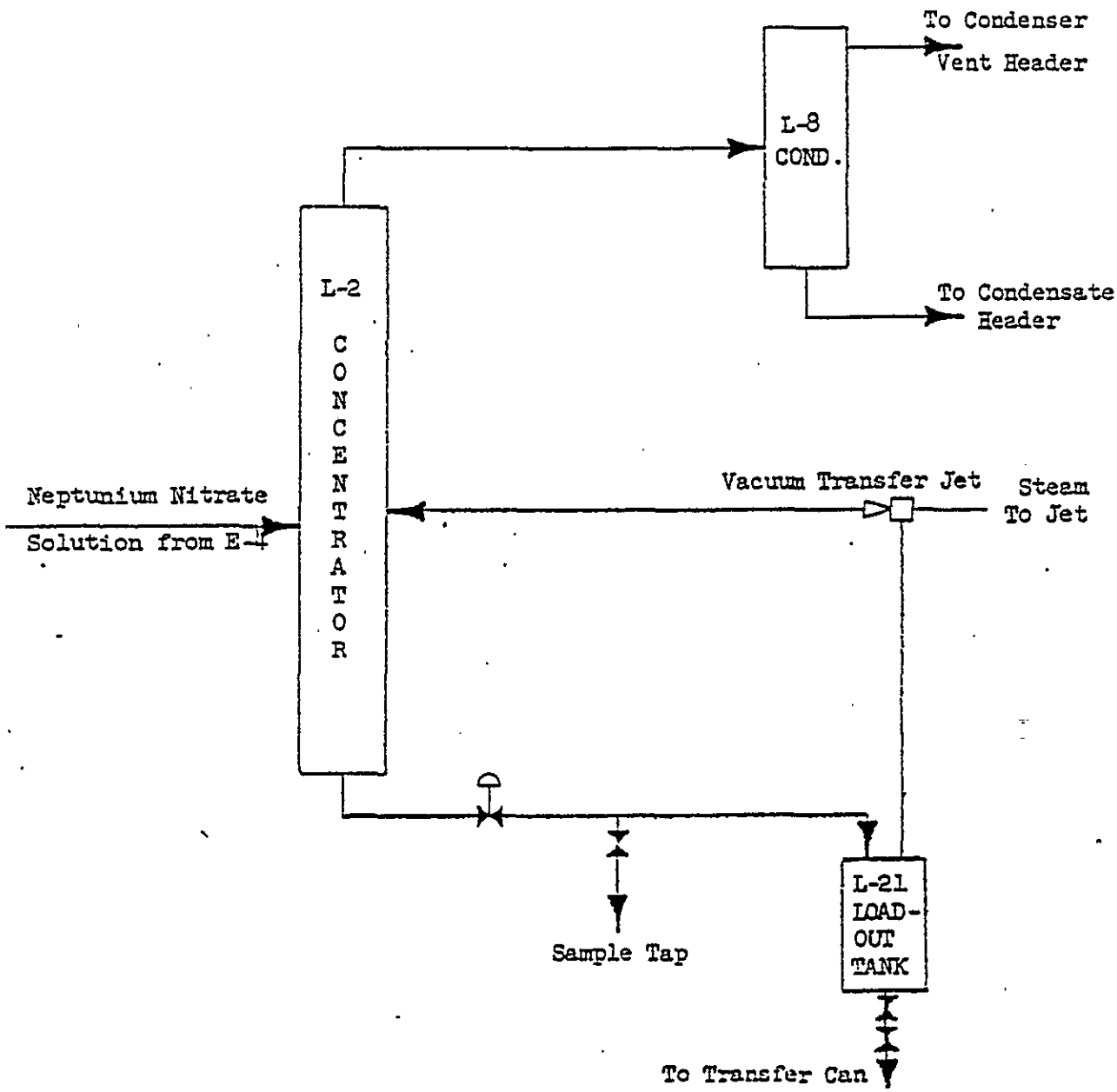
An 800-ft^2 metal storage and service area was added to the north end of the original concrete building.

3.4. 233-S CONVERTED TO PROCESS NEPTUNIUM NITRATE AND CONTACTOR ADDED TO PROCESS PLUTONIUM NITRATE (1962) (Yoder 1962)

See Figure 4, 233-S Neptunium Schematic Flow Diagram.

Project CGC-913 provided the necessary facilities to permit the accumulation, decontamination, and concentration of neptunium nitrate (sometimes referred to as brandy) without interrupting the rest of the REDOX process. The two major process changes in the 233-S portion of the REDOX process resulting from Project CGC-913 were:

Figure 4. 233-S Neptunium Schematic Flow Diagram.



1. Separate concentration and loadout facilities for the neptunium nitrate solution were provided.

2. A new plutonium anion exchange contactor was installed for achieving the desired final plutonium product purification and decontamination. The additional decontamination was required because the 3A-3B Columns had been withdrawn from plutonium purification service and were being used for neptunium nitrate purification.

3.4.1. Neptunium Nitrate (Brandy) Flowsheet

As a result of flowsheet changes in the 202-S Facility due to Project CGC-913, the plutonium nitrate and neptunium nitrate which were sent to the 233-S Facility were steam stripped and free of hexone. Thus, the L-2 concentrator was no longer required as a hexone stripper ahead of the plutonium concentrator and was converted to a neptunium nitrate product concentrator. A new neptunium loadout tank (L-21) was installed in a hood in the loadout room. The L-21 tank was equipped with a vacuum transfer jet, which discharged back to the L-2 concentrator. The concentrated nitrate solution was transferred from L-2 to L-21 and then loaded into a product receiving can. The processing of neptunium nitrate through the 233-S Facility was a batch operation and was done only a few times a year.

3.4.2. Plutonium Flowsheet

The addition of a pushed bed anion exchange contactor, L-18, was the main change in the plutonium flowsheet in the 233-S Facility. The flowsheet for the final concentration, sampling, and loadout out of the plutonium product solution remained unchanged.

Before the plutonium product solution from the 2B port in 202-S was sent to the 233-S Facility, it was stripped of hexone, treated with ozone for ruthenium removal, butted with nitric acid, and finally butted with sodium nitrite or ferrous sulfamate to adjust the plutonium to the four valence state. The solution was then pumped to the XAF Concentrator (L-12) in the 233-S Facility. There the plutonium solution was concentrated to the XAF feed specifications (including a 7.0 molar nitric acid composition). At that concentration, plutonium (IV) existed largely in the form of hexanitratodivalent complex anion, which was readily absorbed by strong base type anion exchange resins. The concentration step destroyed the remaining nitrite ion so that recycle to 202-S Building was safe from the hazard of catalyzing hexone-nitric acid reactions. The concentrated plutonium feed solution passed through a plutonium monitor pot and was then airlifted to the L-10-F feed tank. This tank was a portion of the existing critically safe L-10 tank. The other portion of this tank was the L-10-W tank.

From the L-10-F tank, the feed solution was pumped through a heater and a filter to the feed point on the L-18 anion exchange contactor. The L-18 column was made up of an extraction section, a scrub section, a stripping section, a resin receiver section, and a resin reservoir section. A complete cycle of L-18 operation was made up of an operating period and a push period. During the operating period, the valves controlling process streams to and

from the L-18 unit (XAF, XAS, XAW, XCX, and XCP) were open and all of the valves separating the different sections of the contactor were closed except the valve between the resin receiver and resin reservoir. The plutonium feed stream, XAF, was fed to the unit and the plutonium (IV) anion was extracted by the resin; the loaded resin was scrubbed with a hot (60°C) stream of 7.0 molar nitric acid, XAS; the plutonium was stripped from the loaded resin with dilute nitric acid, XCX, and removed as a product solution, XCP. During the push period, the valves controlling the process stream were closed and all of the valves separating the different sections of the contactor were open except the valve between the resin receiver and the resin reservoir section. The resin was moved hydraulically for a distance of about 11 inches in the contactor by the addition of a controlled amount of pushwater. The process streams flowed clockwise and the resin was intermittently pushed counter-clockwise.

The L-1 tank served as a supply tank for the 7.0 molar nitric acid scrub stream, XAS. This solution was pumped through a heater to the scrub entry nozzle on the L-18 Contactor.

The former L-9 alpha monitor was installed on the waste stream, XAW. Based upon the data from this sampler, waste could be routed either directly to the mixing pot in the 2DW line or to the L-10-W tank. The L-10-W tank in turn drained to the mixing pot in the 2DW line. With this arrangement, waste solution containing appreciable amounts of plutonium could be set aside in the L-10-W tank and later returned to the 202-S process at a controlled rate.

A proportioning pump was installed in the north pipe gallery in the 202-S Building in the XAW line enroute to the 2DW mixing manifold. This pump metered the acid waste (the type of acid was not specified) into the mixing manifold at a controlled rate and provided assurance that the 2DW solution (the ingredients in the 2DW solution were not identified) did not back up into the 233-S facility. Ordinarily, the XAW stream was routed from the contactor into the L-10-W tank and pumped continuously from the L-10-W tank to the 2DW mixing manifold.

A plutonium monitor was installed on the plutonium product line, XCP, between the L-18 contactor and the L-3 concentrator. The operation of the L-3 concentrator and flow to the L-4 product receiver, L-6 product sampler, and loadout were the same as before.

CHEMICAL SAFETY:

The elimination of all hexone-bearing streams from the 233-S portion of the process eliminated the hazard of hexone-nitric acid reactions in the 233-S Facility.

The addition of sodium nitrite to the E-3 tank in the 202-S Building could have presented a hazard of catalyzing hexone-nitric acid reactions, if the nitrite ion was to contact a hexone-bearing stream. To prevent this from occurring, sodium nitrite which was made up in the E-2-A tank on the fourth level was piped only to E-3 tank which handled only hexone-free solution. (The hexone was stripped from the 3BP product solution in the E-2 vessel before being transferred to the E-3 vessel. From the E-3 tank, solution could be transferred only to the L-12 concentrator which was operated at a boiling

temperature and a 7.0 molar nitric acid composition. At these conditions, any remaining nitrite ions were killed, thereby assuring that waste and recycle from the 233-S process was free from nitrite ion.

3.5. FIRE AS RESULT OF CHEMICAL REACTION (1963)

A chemical reaction within the ion exchange unit caused a fire which resulted in extensive damage to the process equipment, gross alpha contamination within the process area, and general contamination spread to other portions of the facility.

Parts of the building were cleaned of gross contamination, and nonsmearable alpha contamination was fixed by covering with a special paint. The type of special paint used was not specified in the records.

3.6. OPERATIONS RESUMED (6 weeks later) (DOE 1978)

Operations resumed without the ion exchange process. The facility was then used for concentration (by evaporation) of plutonium and neptunium nitrate solutions from the REDOX 202-S Building.

3.7. 233-SA FILTER BUILDING CONSTRUCTED (1964)

The 233-SA was built adjacent to the 233-S in 1964 to handle ventilation for 233-S.

3.8. FACILITY PARTIALLY DECONTAMINATED FOR PLANT DEACTIVATION (June 1966) (DOE 1978)

The facility was partially decontaminated for plant deactivation.

The REDOX Plant Deactivation Instructions written for this purpose and the completion reports are given below. Both are included in this section because not all of the instructions were completed as originally expected. In addition, some of the Completion Reports merely state that the work was completed per a particular procedure.

3.8.1. Vessels and Piping - Process (i.e., Internal Flushing)

Instruction 6.2.1:

- Internal decontamination of 233-S process vessels and piping was to have been accomplished by the terminal 57 percent nitric acid flushes which were specified for product recovery by Terminal Processing 6.1.1, "Vessels and Piping." No further internal flushing was to be required.
- External flushing plans were included in Instructions 6.1.2, "Greenhouse," and 6.1.3 and 6.2.3, "Loadout Hood."

Completion Report:

- The final 57 percent nitric acid flush through 233-S concentration and loadout equipment, which was routed to the waste section for subsequent discard in terminal waste batches, was completed. Only very nominal product accumulation was experienced in the internal flush since it followed the second neptunium campaign which had been preceded by and followed with copious flushing associated with the loadout of neptunium.

3.8.2. Vessels and Piping - Terminal Processing (i.e., External Flushing of Vessels and Piping for Product Recovery within the Greenhouse)

Instruction 6.1.1:

- After the 57 percent nitric acid flushes had cleared the 233-S vessels and the L-16 tank was no longer required for recycle of product solution to H-4, the external surfaces of all vessels and piping within the greenhouse were to be flushed with a dilute solution of nitric acid. The purpose of this flush was to remove dust and to bring down any product held on the process pipes as a result of leaks.

- Starting at the fourth level of the viewing room, from points of vantage that provide access with a wand to all equipment within a given area, the spray was to be applied to the tops of vessels and piping. The flush solution, made up of 10 percent nitric acid was to be fed from L-1-A tank under pump pressure via the most direct route. As the solution was collected in the sump, transfer was to be continuous to L-16 until the vessel was full, at which time flushing was to be interrupted pending sample results. Flushing batchwise was to continue, contacting the equipment at each viewing room level in turn. After a reasonable number of sample assays had been reported, the supervisor was to exercise his judgment to decide on continuous rather than batch operation through L-16; interrupting the flush for sampling but not waiting for results. When the acid flush was completed, the operation was to be repeated using demineralized water.

- This instruction was supplemented by a detailed procedure which defined in more specific terms the equipment to be used, techniques to follow, and points of access and supply for the flush.

Completion Report:

- The decontamination flushes external to the vessels were completed as specified.

3.8.3. Greenhouse - Terminal Processing (i.e., Product Recovery - Flushing of Greenhouse Floor and Sump Area)

Instruction 6.1.2:

- Following the external flush of vessels and piping within the greenhouse, a similar flush of the floor and sump area was in order. The same solution and technique employed in Instruction 6.1.1 were to be used.

- Every portion of the floor was to be contacted by manipulating the flushing wand from the first level of the viewing room. Sampling was to be done batchwise as required in Instruction 6.1.1 until the supervisor determined that continuous operation through L-16 was in order.

- See the detailed procedure supplement to Instruction 6.1.1 for application to this instruction.

3.8.4. Greenhouse

Instruction 6.2.2:

- The 233-S greenhouse decontamination flushing was to be accomplished by product recovery flushes specified by Instruction 6.1.2, "Greenhouse." In addition to recovery of products, the flushes were to remove dust and lint and thus create more favorable conditions for future maintenance work and/or ventilation revisions. Combustibles and uninstalled foreign objects were to be removed.

Completion Report:

- The decontamination flushes of the greenhouse external to vessels and piping were completed as specified without exception.

3.8.5. Loadout Hood - Terminal Processing (i.e., Product Removal)

Instruction 6.1.3:

- Introduction: The final effort to flush deposition was to be made in the container loadout section of 233-S loadout hood. It was to be done at the same time the greenhouse floor section was to be flushed since the hood drained to the same sump. The enclosure was not expected to yield more than nominal amounts of plutonium. When this flush was completed, the loadout section and the two sections housing the L-7 and L-22 vessels were to be decontaminated according to instructions contained in 6.2.3.

- A 55-gallon drum or some other satisfactory source defined in the detailed procedure was to be used to supply 10 percent nitric acid for the loadout section flush. The drum was to be pressurized sufficiently to maintain a steady flow of flush solution from the tip of a wand which was to be manipulated to cover all sections of the hood. A water flush was to follow. When this phase was completed, instructions contained in 6.2.3 were to be followed for removal of dust, lint, and gross contamination from the three sections of the hood.

Completion Report:

- Decontamination flushes of the loadout hood external to vessels and piping were completed as specified without exception. These flushes were restricted to use of 10 percent nitric acid followed by water.

3.8.6. Loadout Hood (Decontamination of Surfaces Inside Loadout Hood)

Instruction 6.2.3:

- Schedule: Decontamination of the 233-S loadout hood was to follow product removal accomplished by Instruction 6.1.3.
- Surfaces inside the loadout hood were to be swabbed with a 5 percent aqueous of Turco WO-2, Wedac, or approved substitute to remove dust, lint, and gross contamination.
- Maintenance tools and supplies from loadout hood were to be removed and discarded to contaminated waste container.
- The exterior of the hood was to be cleaned to less than 1,000 disintegrations per minute alpha and less then 500 counts per minute beta and gamma smearable.
- A small filter was to be installed to vent the hood.
- Hood openings were to be sealed with plastic and pressure sensitive tape.

Completion Report:

- The loadout hood was contact decontaminated to levels considered reasonable by Radiation Monitor (RM) Standards prior to sealing all cracks and openings and installing the high efficiency filter in one of the hood glove parts.

3.8.7. Loadout Room

Instruction 6.2.4:

- Loose paint was to be removed from floors and walls, then dust and lint vacuumed.
- Five percent aqueous solution of Turco WO-2, Wedac or approved substitute was to be used to decontaminate floors and walls.
- Bare spots of floors and walls were to be brush painted with No. 88 semi-gloss Amercoat[15] or equal.
- Doors were to be resealed to the viewing room if necessary.
- The scale was to be deactivated.
- Clothes hampers were to be removed.

[15]88 semi-gloss Amercoat is a trade name of Ameron Protective Coatings.

- Portable radiation survey instruments were to be removed and the alpha burst monitor was to be disconnected.
- The valves on the air samplers were to be closed.
- A radiation survey was to be performed.
- Shop supplies were to be removed.

Completion Report:

- Instruments were deactivated.
- Loadout room walls were spray painted with 33 Amercoat. The floors were brush painted.
- Operations: Instructions completed.

3.8.8. Can Storage Room

Instruction 6.2.5:

- The PR and reactor coolant cans were to be shipped.
- Decontaminated, regulated tools were to be transferred to 202-S Special Work Permit (SWP) lobby regulated tool room.
- The door to the loadout room was to be closed and sealed with pressure sensitive tape.
- Shop supplies and combustibles were to be removed.
- The air sampler valves were to be closed.
- The CIA unit was to be disconnected.
- The can storage room doors were to be closed and locked.

Completion Report:

- Instructions were completed without exception.

3.8.9. Viewing Room

Instruction 6.2.6:

- Loose paint was to be removed, then dust vacuumed from grating and floor.
- The L-6 sampler box was to be flushed with a small quantity of 10 percent nitric acid. The surrounding area was to be swabbed with a 5 percent aqueous solution of Turco WO-2, Wedac, or approved equivalent. The box was to be sealed with plastic and pressure sensitive tape.

- The greenhouse ledges were to be swabbed to remove gross contamination.
- Strip coat was to be removed from the floor.
- Bare spots on the walls and floor were to be brush painted with No. 88 semi-gloss Amercoat or equal.
- The viewing room windows were to be masked with paper and the grating spray painted with No. 88 semi-gloss paint or equal to fix residual contamination.
- The air sampler valves were to be closed.
- The CIA unit was to be disconnected.
- All combustibles and other supplies were to be removed, then the doors closed.

Completion Report:

- The viewing room walls and grating were painted with 133 Amercoat[16].
- Operations: Instructions were completed without exception.

3.8.10. Viewing Room Stairwell

Instruction 6.2.7:

- The doors to the viewing room were to be sealed with pressure sensitive tape.
- Loose paint was to be removed, then the dust vacuumed.
- Voids on stairwell side of the outside wall were to be caulked.
- Bare spots on the walls and floor were to be brush painted with No. 88 semi-gloss Amercoat or equal.
- The stairs and floors were to be spray painted with No. 88 semi-gloss Amercoat or equal to fix contamination.
- All combustibles and supplies were to be removed.
- A radiation survey was to be performed.
- Doors leading to airlocks were to be closed.

[16]133 Amercoat is a trade name of Ameron Protective Coatings.

Completion Report

- The stairwell was spray painted with 33 Amercoat.
- Operations: Instruction were completed without exception.

3.8.11. Airlocks

Instruction 6.2.8:

- Heaters were to be switched to the OFF position.
- Laundry bags were to be removed.
- Area was to be decontaminated with 5 percent aqueous solution of Turco WO-2 or Wedac.
- Combustibles and supplies were to be removed.
- Electrical service to poppys was to be disconnected and left in airlock.
- Doors were to be closed and locked.

Completion Report:

- Operations: Instructions were completed without exception.

3.8.12. Pipe Gallery

Instruction 6.2.9:

- Liquid from the L-1A tank was to be emptied, then the tank water flushed, and drained.
- Free board above boron rachig rings was to be measured and recorded.
- The ventilation filter between the pipe gallery and viewing room was to be changed out.
- Deactivation Instructions 6.4 and 6.5 were to be completed.
- Loose paint was to be removed and bare spots were to be brush painted with No. 88 semi-gloss Amercoat paint or equal. Paint was to be sprayed if necessary to reduce contamination.
- Combustibles, tools, and shop supplies were to be removed from the pipe gallery and airlocks.
- Laundry hampers were to be removed.
- RM portable instruments were to be removed.
- Portable electric devices were to be disconnected.

- The air sampler valves were to be closed.
- Doors were to be closed and locked.

Completion Report:

- The lower section of the pipe gallery walls was spray painted with 33 Amercoat. The floor was brush coated.
- Instruction were completed without exception.

3.8.13. Heating and Ventilation

Instruction 6.3:

- Normal heating and ventilation was to be maintained in the 233-S Facility.
- Pipe gallery filters were to be changed out as noted in Instruction 6.2.9 and the No. 1 and No. 2 inlet filters of the 233-S exhaust facility were to be replaced.

Completion Report:

- Heat and Vent Instructions were completed without exception.

3.8.14. Utilities

Instruction 6.4:

- Sanitary water to the ventilation units was to remain in service. All other water systems were to be deactivated according to Instructions 11.22, 11.26, and 12.3.
- Process and breathing air service was to be deactivated according to Instructions 11.22 and 12.2.
- Instrument air servicing the heat and supply ventilation and exhaust units and associated controls was to remain active.
- Instrument air associated with sump weight factor instrumentation was to remain in service.
- Instrument air not required for item 3 and 4 of this Instruction was to be deactivated according to Instructions 11 and 12.2.
- Steam servicing the heat and supply ventilation units were to remain active. All other steam services were to be deactivated according to Instructions 11.2 and 12.1.
- Deactivation of steam, water, air, and chemical services to the 233-S greenhouse was to include physical isolation by blanking or capping inlets to the greenhouse.

Completion Report:

- Instrument and operations instructions for 233-S utilities were completed without exception.

3.8.15. Equipment

Instruction 6.5:

- Equipment associated with the following was not to be deactivated:

  (1) Ventilation Supply and Exhaust Systems
  (2) Greenhouse Sump Weight Factor Indication and Alarm
  (3) Fire Detection and Alarms.

- Lighting deactivation was to be consistent with Instruction 11.2.10.

- All other equipment was to be deactivated consistent with Instructions 6.2, 6.4, and 6.7.

- All equipment deactivation was to be according to Instructions 11.1, "Instrument," and 11.2, "Mechanical-Electrical."

- Deactivation of equipment associated with utilities was to be according to Instructions 12.1.2, 12.1, 12.3, and 12.7.

Completion Report:

- Instrument and operations instructions were completed without exception.

3.8.16. Operating Gallery

Instruction 6.6:

- Deactivation of the operating gallery was to follow completion of Instructions 6.1, 6.2, and 6.5.

- Deactivation Instructions 4.17 and 16.5 were to be completed.

- Portable electrical devices were to be disconnected.

- The air sampler valves were to be closed.

- The alpha burst monitor was to be disconnected.

- Combustibles and shop supplies were to be removed.

Completion Report:

- Instrument and operations instructions were completed without exceptions.

3.8.17. Change Room

Instruction 6.7:

- The restroom was to be deactivated per Instruction 16.4.
- All materials were to be removed from lockers.
- Electric service to the water fountain was to be removed and water drained from the unit. The water inlet and top of the fountain were to be covered with plastic and pressure sensitive tape.
- The wood bench and other combustibles were to be removed and discarded.
- Shop supplies were to be transferred to 202-S store room.
- Used laundry hampers were to be removed and sent to laundry.
- SWP apparel was to be removed and shipped to laundry.
- The floor was to be swept and mopped.
- Janitorial equipment and supplies were to be removed and discarded since they were potentially contaminated.
- Any masks that were used were to be left in the storage rack.
- A radiation survey was to be performed and if necessary, decontaminated.
- The door to the loadout room was to be closed and locked.

Completion Report:

- Operations instruction were completed without exception.

3.8.18. Storage Building

Instruction 6.8:

- SWP apparel was to be shipped to laundry.
- Shop supplies from the operations section of building was to be transferred to the 202-S storeroom.
- All combustibles were to be removed from the building.
- Electrical power to the building was to be de-energized.
- The area was to be swept, then doors closed and locked.

Completion Report:

- Operations instructions were completed without exception. However, verbal information indicates that the electric power to the entire facility was not de-energized. The process circuits were de-energized only.

3.9. FACILITY TAKEN OUT OF SERVICE (June 1967)

Both the REDOX and the 233-S facilities were taken out of service and placed in layaway status.

3.10. FACILITY CHANGED TO LAYAWAY STATUS (August 1969)

The layaway status was changed to layaway condition (retired).

3.11. FACILITY SELECTED AS DEMONSTRATION PROJECT (1978)

The 233-S Facility was selected as a demonstration project for dismantlement of retired contaminated facilities.

3.12. CUSTODY OF FACILITY CHANGED (April 24, 1978)

Custody of the 233-S and 233-SA facilities was changed from Product Handling and Special Services to Tank Farm Operations, D&D Program (Plant and Equipment Transfer No. Rockwell 78-128).

3.13. INDICATION THAT FILTER PIT STILL IN SERVICE (September 1, 1978) (Kover 1978).

A remark in a memo (Kover 1978) relayed the information that the filters in the filter pit between 202-S and 233-S had failed dioctyl phthalate testing and must be replaced. This indicates that these filters were not removed and decontamination efforts for the filter pit area were not performed, at least as of this date.

3.14. DECONTAMINATION AND DECOMMISSIONING ACTIVITIES (1979)

3.14.1. Can Storage and Product Removal Can Storage Rooms (RHO 1979b).

Completion:

- Continuous air monitors (CAM) were installed in both rooms.
- Specified fluids and electrical circuits were isolated from the work area.

- Loose dust and debris were removed by sweeping and wiping down with water dampened rags.

- Miscellaneous equipment and supplies (lockers, shelves, etc) were removed.

- Two lockers and a hanger for plastic sheeting were identified as items with potential future use. These were surveyed and released for uncontrolled use in the can storage room.

- The 75-gal resin storage tank was disconnected from its associated piping, and subsequently transported to land burial.

- Most of the equipment in the two rooms was dispositioned to land burial.

- Prior to entering the two rooms, a cleaning solution of trisodium phosphate (TSP) and water was prepared in the SWP Change Room. At the time, methods and procedures did not exist to dispose of plutonium contaminated liquid waste from 233-S. The TSP cleaning solution was prepared in a radiologically clean portion of the building to assure that the unused solution could be disposed of without the possibility of being contaminated. Only rags dampened with cleaning solution were allowed in the two rooms.

- Decontamination began on the rooms' ceilings, then proceeded down the walls to the floors. The TSP cleaning solution successfully removed the accumulated dirt, grease, and whatever slight contamination that may have been present on the surface, with one exception. A hot spot of approximately one square foot in area was found in the location where the resin tank was bolted to the floor prior to removal. The level of contamination was 1,500 dpm per swipe. Three successive attempts to decontaminate this area with TSP proved to be totally ineffective as the contamination was ingrained into the paint. Eventually the contaminated paint was removed with a commercial gel type paint stripper containing methylene chloride, methanol, and mineral spirits.

- Following decontamination of the rooms, a radiation survey was performed.

- Prior to applying the strippable coating, all floors, ceilings, and walls were subdivided with tape into squares approximately two feet on a side. The purpose of the taped grid was to facilitate lifting an edge of the strippable coating when removed.

- Turco 5931 (white) was the strippable coating used. Two coats of strippable coating were applied to the surfaces of the can storage room initially. Measurements indicated that two coats exceeded the required 0.005-inch dry film thickness. A test patch was then designated to determine if the strippable coating could be satisfactorily stripped without the necessity of applying additional coatings.

  While attempting to remove the strippable coating, it was discovered that the Turco 5931 adhered so tightly to the underlying original paint that it did not strip.

Contact with the vendor resulted in a suggestion that a layer of mineral oil be applied to the room surfaces prior to applying the strippable coating in an attempt to reduce the adhesion. A test patch was designated in the PR can storage room for this purpose. Meanwhile, strippable coating continued to be applied throughout the can storage and PR can storage rooms.

Mineral oil in various amounts was applied to the test patch. Five coats of Turco 5931 were applied over the test patch and the remaining surfaces of the can storage and PR can storage rooms. Removal of the strippable coating over the mineral oil test patch was again very difficult. There was no detectable difference in the adhesion to the underlying paint using mineral oil. In addition, the added thickness of five coats resulted in very little additional strength over two coats. It still bonded to the underlying paint and could only be removed in very small pieces.

The Turco 5931 would not strip on either painted concrete or painted sheet metal surfaces. Another produce (DuPont D-1000) was tested. It proved to be easier to remove than Turco 5931 but still too difficult for use in large areas.

Five coats of Turco 5931 were applied to all exposed surfaces in the airlock, can storage and PR can storage rooms.

3.14.2. Loadout Hood (RHO 1980a)

Completion:

- Sampling of the air within the hood for hexone, iodine-129, and airborne contamination was conducted. Analysis of the air samples showed no detectable hexone or iodine-129 present.
- Liquid samples were drawn from tanks L-7, L-21, and L-22 to characterize the contents of each tank. The L-7 tank was empty, tank L-21 sample arm contained approximately 2 tablespoons of liquid, and tank L-22 contained about 1 liter of a liquid that was light green in color. The liquid was sent to the analytical laboratory at Building 234-S. Analysis showed the sample to contain 0.525 grams plutonium per liter of solution. No mention is made of a chemical analysis being performed.
- A containment airlock tent at the doorway between the PR can storage room and the loadout room was installed.
- CAMs were installed in the loadout room.
- High efficiency particulate air (HEPA) filters were installed over two large open slots located on top of the hood.
- The monorail hoist was load tested.
- The loadout hood doors were removed and special containments over the openings were installed.

- All visible accumulations of loose dust and debris were vacuumed using a HEPA filtered vacuum cleaner.

- Chemical decontamination and fixation efforts continued within the hood:

  Decon Chem: None
  Fixative: **Butvar Strippable Coating**

  Decon Chem: **Radiacwash** (A spray mist with ethylenedrametetracelic acid sequestrant)
  Fixative: **Clear Coat**

  Decon Chem: **Kleno Bowl** (dilute hydrochloric acid and detergents)
  Fixative: **Turco Contam-Affix, removable**

  Decon Chem: **Turco 4306-C (sulfamic acid)**
  Fixative: **Water-based Latex Enamel Paint**

  Decon Chem: **Turco 4306-D (sodium bisulfate)**
  Fixative: **Aqualoid* 15-93 Strippable Coating***

  * May be Acryloid

- Survey results indicated that the chemicals and fixatives were removing/fixing surface contamination but that the surfaces within the hood were constantly recontaminated due to the internal air exhaust turbulence. When decontamination/fixation efforts had reduced surface contamination levels as low as reasonably practicable, dismantling of the hood components commenced.

- Extensive dismantling efforts removed all internal components within the hood, including the L-7 tank and shielding, the PR can positioner, the L-21 tank and shielding, the L-22 tank and shielding, associated piping, hood doors and panels, and the overhead monorail. Heavy items such as the lead shielding were handled with the monorail's hoist. All items were decontaminated and fixed to minimize surface contamination levels, then wrapped in plastic prior to placement in 55-gallon drums. Large items were removed through an open door in the hood.

- Towards the end of fiscal year (FY) 1979, it was recognized that dismantling of the hood would not be completed by the scheduled date. Therefore, to stabilize the hood for the scheduled shutdown of decontamination and decommissioning (D&D) operations during the entire FY 1980, plexiglass panels with integral HEPA filters were cut to size and installed to replace the hood doors and cover other openings. The panels serve to maintain the air balance through the hood and to isolate remaining internal hood surface contamination from the loadout room.

  Loadout hood tanks and associated pipes contained appreciable amounts of **highly contaminated acid.**

3.14.3. Processing of Hood Waste through the 231-Z Sectioning/Pretreatment Facility and the Electropolishing Facility (RHO 1980b).

- Some waste resulting from decontamination and dismantling of the 233-S loadout hood was transferred to the 231-Z Facility. The purpose was to perform vibratory finishing and in situ electropolishing techniques on the waste to evaluate the effectiveness in reducing solid radioactive waste from transuranic to nontransuranic status. Radiological analyses were performed but no mention is made of any chemical analyses being performed.

3.15. PIPE GALLERY AND CONTROL ROOM - CHARACTERIZATION (April 18, 1980) (RHO 1980c)

- No mention of any chemical analyses was located; however, some lines in the pipe gallery were disassembled to determine the presence of liquid. Some of the lines selected for characterization were found to contain contaminated liquid.

3.16. SAFETY ASSESSMENT DOCUMENT, Rev. 1, ISSUED (July 22, 1980)

RHO-CD-658, Rev. 1, "233-S Building Decontamination and Decommissioning Safety Assessment Document," (RHO 1979a) was issued.

3.17. DECONTAMINATION AND DECOMMISSIONING OPERATIONS SAFETY REQUIREMENTS, Rev. A, ISSUED (April 20, 1981)

D0104AR0001 Rev. A, "233-S D&D Operations Safety Requirements," (RHO 1981a) issued. Supersedes and replaced the former Appendix A of RHO-MA-658.

3.18. ROOF OF FACILITY FOAMED (1984)

Verbal communications indicate that the roof of this facility was foamed in 1984. Urethane PSI-5200-30[17] was used, followed by Silicone Rubber Dispersion 3-5000[18].

3.19. NONDESTRUCTIVE ANALYSIS PERFORMED (1987)

Nondestructive Analysis was performed in November 1987.

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[17]Urethane PSI-5200-30 is a trade name of Polythane Systems Incorporated.

[18]Silicone Rubber Dispersion 3-5000 is a trade name of Dow Corning Corporation.

3.20. STABILIZATION ACTIVITIES (Mid-1987 through December 1987) (Beckstrom 1988).

Work Completed:

- The damper for the east exhaust fan, which would not close properly, was repaired prior to start of decontamination activities inside the building.

- Decontamination activities in the outside area between the 202-S and 233-S Buildings consisted of removing the deteriorated protective covering over the connecting tunnel between the two buildings and applying a new protective barrier over the tunnel consisting of a thick layer of ALARA Coat. The original protective covering over the tunnel along with all the loose dirt and gravel in the area were placed in 55-gal waste drums. The ground surface between the two buildings and the north wall of 202-S was then sprayed with asphalt emulsion to fix the remaining contamination.

- The 202-S column transfer trench, although not associated with the 233-S Building, is located on the west side of the building. The trench is a deep, underground structure that was used to transfer large ion exchange columns in and out of the 202-S Building. The top of the trench is covered with diamond plate panels. The inside of the trench is contaminated, and radiation surveys have identified loose surface contamination along the concrete curbs which hold the steel panels.

  The joints between the steel cover panels and along the concrete curbs of the lay-down (ion exchange column) trench were sealed with cloth tape and coated with asphalt emulsion to prevent further release of contamination. The lay-down trench is not part of the 233-S Facility.

- Interior Decontamination and Stabilization: The original decontamination plan was to vacuum and wipe down with damp rags all surfaces in the contaminated areas. It was discovered that wiping down the surfaces was ineffective because decontaminated areas were soon recontaminated due to the high degree of air turbulence from the ventilation system. Wiping the surfaces was therefore discontinued on the ground floor, except in the PR can loadout room, where air turbulence was most significant, and emphasis was placed on fixing the contamination with paint.

- PR Can Loadout Room: A total of five 55-gal drums of waste were removed from the loadout room. Most of this waste was generated from housekeeping and decon activities. The loadout room was the last room to be decontaminated and was accomplished by wiping down all accessible surfaces with damp rags until no significant change in detectable alpha activity was observed with standard Hanford portable survey instruments.

  The emergency door between the loadout room and the SWP change room was sealed to prevent contamination from escaping into clean areas of the building. This was accomplished by taping a strip of cheesecloth over the space between the floor and door, and around the door jambs, then

fixing the strip of cloth in place with ALARA Coat. This method provides an effective barrier without preventing the door from being opened in case of an emergency.

- Stairwell and Airlocks: The ground floor level of the stairwell and the two airlocks to the south contained excessive quantities of miscellaneous trash, debris, and old SWP clothing. This contaminated material was placed in twelve 55-gal waste drums along with the waste associated with decontamination activities. The upper three levels of the stairwell were totally free of trash and debris.

  The stairwell and airlocks were vacuumed to remove the large buildup of dust and spider webs that had accumulated over time. The upper levels of the stairwell were wiped down with damp rags; however, a great deal of time was not expended on the task. The main emphasis was to remove the bulk of the loose surface material. After decontamination activities, the stairwell and airlocks were spray painted to fix the remaining contamination. The type of spray paint was not identified in the records.

  The exit doors located in each airlock were sealed in the same manner as the emergency door in the loadout room. The purpose of this action was to prevent dust and dirt from being drawn into the airlocks through the cracks around the doors and prevent contamination from leaking out around the doors in the event of a release inside the building.

- Viewing Room and Process Hood: The viewing room was the most highly contaminated area subject to the stabilization activities. Only two 55-gal drums of waste were removed from this room. One drum was filled with waste material from the ground floor area and one drum from the upper three levels. The waste consisted primarily of paper, plastic, wood, cloth, tape and metal (scrap metal, nuts, bolts, and old hand tools). A vacuum cleaner was used to remove spider webs and the dust and dirt that had accumulated on the horizontal surfaces. No attempt was made to vacuum 100 percent of the surface area in this room.

  All glove port openings in the process hood were recapped and resealed. All observable holes and openings in the hood were also sealed. Upon completion of debris removal, vacuuming operations and sealing of the process hood, the entire room was sprayed with several coats of latex paint to fix the remaining contamination. The type of latex paint was not identified in the records. After painting operations were completed, HEPA filters were installed over each of the four inlet openings in the process hood.

3.21. CHARACTERIZATION PLAN (February 16, 1990)

WHC-SD-CP-TP-055 Rev 0, "Characterization of 233-S Facility, Measurements Plan," (WHC 1990) by V. B. Subrahmanyam was issued.

3.22. ROOF AND EXHAUST DUCTS ON ROOF PAINTED WITH AMERCOAT AND FIXED WITH AEROSPRAY 70-A (August 1990)

The roof and exhaust ducts on the roof were painted with Amercoat 33 and two coats of Aerospray 70-A Binder were applied to fix loose contamination.

3.23. ADDITIONAL HAZARDOUS MATERIALS INFORMATION (September 1990)

- Several engineering drawings indicate that this facility contains lead (examples are the L-21 loadout tank and enclosure and the L-7 tank and shield).
- Drawings and visual inspection of some of the piping in the facility indicates that this facility may contain asbestos.
- Mercury is normally utilized in instrument/electrical equipment and may have been used in the 233-S Facility.
- Acetylene tetrabromide is a manometer fluid and may have been used in the 233-S Facility.
- Polychlorinated biphenols (PCB) were often added to many oils to enhance their fire resistive and electrical properties. High concentrations of PCBs can be found mainly in transformer and hydraulic oils which were used in elevators, larger transformers, floor hoists, vacuum pumps, and hydraulic operated process equipment. PCBs may have been used in the 233-S Facility.
- In the near future, it is expected to foam the area between the 202-S and 233-S facilities to fix contamination. It is also expected to foam the laydown trench located to the west of the 233-S Facility. The type of foam to be used is URETHANE PSI-S200-30 by Polythane Systems Inc. After the foam application, SILICONE RUBBER DISPERSION 3-5000 will be applied.
- A search was conducted by Ms. JoAnn Brehm for chemical flow from the 202-S to the 233-S Facility during the process years. The following three lines were located:

  1. Tank 503 - Ferrous Sulfamate Solution Adjustment Tank. Ferrous sulfamate was diluted with demineralized water to a 30 weight percent ferrous sulfamate solution.
  2. 3BP Sampler (E-3) - Third Plutonium Cycle. From the 3BP and the IBP streams, the following chemicals were identified:

     - Plutonium
     - Neptunium
     - Ruthenium
     - Nitric acid
     - Silica (SiO_2)
     - Hexone
     - UNH (uranyl nitrate hexahydrate or uranyl nitrate in hexone)

- Aqueous aluminum nitrate solution
- Sulfamic acid (NH_2SO_3)
- Ions of:
  - Aluminum
  - Iron
  - Chromium
  - Sodium
  - Sulfuric
  - Calcium
  - Magnesium
  - Chlorine

3. 3BP Rework Tank (E-4) - Third Plutonium Cycle. The following chemicals were identified:

   - Same as the 3 BP Sampler
   - Ozone

4. LIST OF IDENTIFIED CHEMICALS

- **ACETYLENE TETRABROMIDE**

  Material Safety Data Sheet (MSDS) 2112: **1,1,2,2-TETRABROMOETHANE**

  This manometer fluid contains 100 percent **ACETYLENE TETRABROMIDE** with a trace of red dye. The recommended exposure level for an 8-hour average exposure is 1.0 parts per million (ppm). For short-term exposures (less than 15 minutes), the recommended exposure level is 1.5 ppm. Potential effects of elevated short term exposures to **ACETYLENE TETRABROMIDE** may include eye, skin, and respiratory irritation. Absorption through the intact skin is also possible.

  MSDS 2112 describes **ACETYLENE TETRABROMIDE** has analphatic halogen. It is a pale yellow, nonflammable liquid with a sweet, chloroform-like odor. The manometer fluid is hazardous and requires handling wiht nitrite protective gloves.

  It is unknown if **ACETYLENE TETRABROMIDE** was used in this facility. Sampling is recommended to verify the absence of this product.

- **AEROSPRAY-70A BINDER**

  MSDS 20319: **AEROSPRAY-70A BINDER**

  In 1990, the exhaust ducts and the roof of the facility were painted with Amercoat, then two coats of **AEROSPRAY-70A BINDER** were applied to fix loose contamination.

AEROSPRAY-70A BINDER is a polyvinyl acetate emulsion. It is not regulated by state or federal waste regulations and use of this product will not produce a mixed waste. Therefore, sampling for chemical analysis is not required.

- **ALARA COAT**

  MSDS 20758: **ALARA 1146 CAVITY DECON**[19]
  MSDS 14254: **ALARA 1146 DECON**[20]

  During stabilization activities in 1987, the deteriorated protective covering over the pipe tunnel between 233-S and 202-S was removed and a thick layer of **ALARA COAT** was applied.

  During the same timeframe, **ALARA COAT** was used to fix the strips of cheesecloth which were placed around the emergency door between the Loadout Room and the SWP Change room. The door was sealed in this manner to prevent contamination from escaping into clean areas of the building.

  Although this product does not appear to be Occupational Safety and Health Act-regulated, there is a statement in the MSDS that it does contain a chemical known by the state of California to cause cancer and/or birth defects or other reproductive harm. The chemical is not identified.

- **ALPHA BURST MONITOR**

  MSDS: Not Applicable.

  No MSDS is available for the **ALPHA BURST MONITOR**. However, some detectors are known to contain hazardous materials. Visual inspection during future decommissioning activities will establish the existence of this product.

- **AMERCOAT 33**

  MSDS 10288: **AMERCOAT 33**

  During the 1966 partial decontamination for plant deactivation, **AMERCOAT 33** was either brushed or spray painted on the loadout room walls and floor, the viewing room walls and grating, the stairwell, the lower section of the pipe gallery walls and the pipe gallery floor.

  Drawing H-2-17947 also states that all carbon steel material in the process area shall be painted in accordance with **AMERCOAT 33**.

  In 1990, the exhaust ducts and the roof of the facility were painted with **AMERCOAT 33**, then two coats of Aerospray-70A binder were applied to fix loose contamination.

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[19]Alara Coat 1146 Cavity Decon is a trade name of Carboline Company.

[20]Alara Coast 1146 Decon is a trade name of Carboline Company.

The MSDS lists the hazardous ingredients as follows:

- Methyl isobutyl ketone
- Toluene
- Xylene
- Chlorinated paraffin
- Vinyl chloride resin
- Polyvinyl chloride resin
- VM and P naphtha
- Cycloparaffin
- Methyl ethyl ketone
- Mica
- Acrylic resin
- Pigments:
  - Titanium dioxide
  - Chromium oxide
  - Iron oxide
  - Carbon black

Visual inspection during future decommissioning activities will establish the existence of this product.

- **AMERCOAT 88 SEMIGLOSS**

MSDS: N/A. AMERCOAT 88 was not used.

In the referenced cases where use of **AMERCOAT 88 SEMIGLOSS** or equal was specified, Amercoat 33 was used instead.

- **AQUALOID (or ACRYLOID) 15-93 STRIPPABLE COATING**

MSDS: Not available

During the 1979 D&D activities, chemical decontamination and fixative efforts were performed inside of the Loadout Hood. **AQUALOID 15-93 STRIPPABLE COATING** was one of the fixatives used.

Although the internal components of the loadout hood have been removed, it is possible that **AQUALOID 15-93 STRIPPABLE COATING** is present on the external and internal walls of the loadout hood, as well as the area surrounding the hood.

Visual inspection during future decommissioning activities will establish the existence of this product.

- **ASBESTOS**

MSDS 12839: **ASBESTOS**

It is possible that **ASBESTOS** was used in construction of the roof and walls of the facility although drawings only indicate that some type of insulation was used.

According to MSDS 12839, long-term exposure to high concentrations of asbestos fiber may cause pulmonary disease. No hazardous ingredients are listed; although hazardous mixtures of other liquids, solids, or gases lists **CHRYSOTILE ASBESTOS FIBER.**

Visual inspection during future decommissioning activities will establish the existence of this product.

- **ASPHALT EMULSION**

  MSDS 15402: **ASPHALT EMULSION COATING.**

  During the 1979 stabilization activities, the ground surface between the 202-S and the 233-S buildings was sprayed with **ASPHALT EMULSION** to fix the remaining contamination. Current onsite inspection of this area indicates that the **ASPHALT EMULSION** was sprayed on the northern wall of the 202-S Facility but does not appear on the 233-S south wall. The ground area between the buildings appears to be primarily concrete although the ground area directly above the pipe tunnel has the coloration of **ASPHALT EMULSION.**

  In addition, the joints between the steel cover panels and along the concrete curbs of the lay-down trench (ion exchange column trench) were sealed with **ASPHALT EMULSION** to prevent further release of contamination.

  MSDS 15402 indicates that there are no applicable hazardous ingredients; however, recent literature indicates that **ASPHALT EMULSION** does contain hazardous substances.

  Visual inspection during future decommissioning activities will establish the existence of this product.

- **BUTVAR STRIPPABLE COATING**

  MSDS 10518: **BUTVAR AQUEOUS DISPERSION BR.**[21]
  MSDS 12763: **BUTVAR DISPERSION BR RESIN**[22]

  During the 1979 D&D activities, chemical decontamination and fixative efforts were performed inside of the Loadout Hood. **BUTVAR STRIPPABLE COATING** was one of the fixatives used.

  Although the internal components of the Loadout Hood has been removed, it is possible that **BUTVAR STRIPPABLE COATING** is present on the external and internal walls of the loadout hood, as well as the area surrounding the hood.

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[21]Butvar Aqueous Dispersion Br. is a trade name of the Monsanto Company.

[22]Butvar Dispersion Br Resin is a trade name of the Monsanto Company.

U.S. Department of Transportation, Superfund Amendment and Reauthorization Act, Comprehensive Environmental Response, Compensation, and Liability Act, and OHSA hazard notifications are listed as Not Applicable. Because **BUTVAR STRIPPABLE COATING** does not appear to contain hazardous substances, sampling for its presence is not recommended.

- **CAULK**

MSDS 18764: **CAULK LATEX**

During the 1966 partial decontamination activities for plant deactivation, reference is made to using **CAULK** in the voids on the stairwell side of the outside wall.

No mention is made of the type of **CAULK** used. The **CAULK** could be considered hazardous if it is lead based. MSDS 18764 also lists hazardous ingredients as follows:

- Mineral spirits
- Ethylene glycol
- Titanium dioxide.

Visual inspection during future decommissioning activities will establish the existence of this product.

- **CLEAR COAT**

MSDS 15584: **CLEAR URETHANE SEAL COAT (AEROSOL) #2049**
MSDS 18384: **KLEAR KOTE**[23]

During the 1979 D&D activities, chemical decontamination and fixative efforts were performed inside of the loadout hood. **CLEAR COAT** was one of the fixatives used.

Although the internal components of the loadout hood were removed, it is possible that **CLEAR COAT** is present on the external and internal walls of the loadout hood, as well as the area surrounding the loadout hood.

It is difficult to assess the hazardous components of **CLEAR COAT** because the reference to this fixative did not give the exact name or an indication of the manufacturer.

MSDS 15584 lists the ingredients as follows:

- American Society for Testing and Materials Type I Polyurethane (resin contains no free isocyanante).
- Xylene (hazardous)
- Mineral spirits (hazardous)
- Methylene chloride (hazardous)

[23]KlearKote is a trade name of Dynacco.

- 1,1,1 Trichloromethane (hazardous)
- Propane (propellent function only).
- Isobutane (propellent function only).

Thermal hazardous decomposition products are listed as follows:

- Hydrogen chloride
- Carbon monoxide
- Chlorine
- Possibly phosgene

MSDS 18384 lists the hazardous ingredients as follows:

- Xylene
- Ethyl benzene
- Methoxyl propanol acetate
- Isophorone diisocyanate
- Prepolymer resin

Hazardous decomposition products are not listed.

Visual inspection during future decommissioning activities will establish the existence of this product.

- **DUPONT D-1000**

MSDS: Not available.

During the 1979 D&D activities, **DUPONT D-1000** was used on a small test patch in either the can storage room or the PR can storage room. It was used as a test to find out if it was easier to remove than Turco 5931.

Sampling to confirm the presence of **DUPONT D-1000** is considered unnecessary because only a small patch was used and apparently much of it was removed during the test.

- **FERROUS SULFAMATE**

MSDS 1228: **FERROUS SULFAMATE** (50 percent aqueous by Thatcher Co.)

In 1962, 233-S was converted to process neptunium nitrate and a contactor was added to process plutonium nitrate. During the plutonium nitrate process, before the 2BP was sent to the 233-S Facility, it was stripped of hexone, treated with ozone for ruthenium removal, butted with nitric acid, and finally butted with sodium nitrite or **FERROUS SULFAMATE** to adjust the plutonium to the four valence state. The solution was then pumped to the L-12 concentrator in the 233-S Facility.

During the 1966 partial decontamination for plant deactivation, internal decontamination of the 233-S process vessels and piping was accomplished by using 57 percent nitric acid flushes.

FERROUS SULFAMATE is a dark green, odorless, liquid. It is a salt of metal and acid and is listed in MSDS 1228 as hazardous.

Because of the flushing that was performed, **FERROUS SULFAMATE** would not be expected to be found in appreciable quantities in the process equipment; however, it is recommended that sampling be performed in the process equipment, process lines, process hood, and sumps and traps for chemical analyses to confirm the absence of **FERROUS SULFAMATE**.

- **HEXONE AND HEXONE-NITRIC ACID REACTIONS**

MSDS 1343: **HEXONE (METHYL ISOBUTYL KETONE)**

During the 1955 initial plutonium nitrate process, the plutonium solution (3BP) was transferred to L-1 under batch control from E-3. The solution was fed to L-2 by pump or jet where the **HEXONE** was stripped and 5 to 35 percent concentration was achieved.

In 1962, 233-S was converted to process neptunium nitrate and a contactor was added to process plutonium nitrate. As a result of flowsheet changes in the 202-S Facility due to Project CGC-913, the plutonium nitrate and the neptunium nitrate solutions which were sent to the 233-S were steam stripped and free of **HEXONE**. Thus, the L-2 concentrator was no longer required as a **HEXONE** stripper ahead of the plutonium concentrator and was converted to a neptunium nitrate product concentrator.

The elimination of all **HEXONE**-bearing streams from the 233-S portion of the process eliminated the hazard of **HEXONE-NITRIC ACID** reactions in the 233-S Facility.

The addition of sodium nitrite to the E-3 tank in the 202-S Building would have presented a hazard of catalyzing **HEXONE-NITRIC ACID** reactions if the Nitrite ion was to contact a **HEXONE**-bearing stream. To prevent this from occurring, sodium nitrite (which was made up in the E-2-A tank on the fourth level) was piped only to E-3 tank which handled only **HEXONE**-free solution. The **HEXONE** was stripped from the 3BP product solution in the E-2 vessel before being transferred to the E-3 vessel. From the E-3 tank, solution could be transferred only to the L-12 concentrator which was operated at a boiling temperature and a 7.0 molar nitric acid composition.

During the 1966 partial decontamination for plant deactivation, internal decontamination of the 233-S process vessels and piping was accomplished by using 57 percent nitric acid flushes.

During the 1979 D&D activities, sampling of the air within the hood for **HEXONE**, Iodine-129, and airborne contamination was conducted. Analysis of the air samples showed no detectable **HEXONE** or iodine-129 present.

According to MSDS 1343, **HEXONE** is an aliphatic ketone. It is a colorless liquid with a faint pleasant ketonic and camphor odor, and is listed as toxic.

Because of flushing, **HEXONE** or **HEXONE-NITRIC ACID** reactions would not be expected to be found in appreciable quantities in the process equipment; however, it is recommended that sampling be performed in the process equipment, process lines, process hood, and sumps and traps for chemical analyses to confirm the absence of **HEXONE** or **HEXONE-NITRIC ACID** reactions.

- **IODINE-129**

  MSDS: Not Applicable (radiologically hazardous).

  During the 1979 D&D activities, sampling of the air within the hood for hexone, **IODINE-129**, and airborne contamination was conducted. Analysis of the air samples showed no detectable hexone or **IODINE-129** present.

  A radiological characterization of this facility is currently being conducted by Analytical Systems Laboratories.

- **KLENOBOWL** (dilute hydrochloric acid and detergents)

  MSDS 13069: **KLENOBOWL**

  During the 1979 D&D activities, chemical decontamination and fixative efforts were performed inside of the loadout hood. **KLENOBOWL** was one of the decontamination chemicals used.

  Although the internal components of the Loadout Hood have been removed, it is possible that **KLENOBOWL** is present on the external and internal walls of the loadout hood, as well as the area surrounding the loadout hood.

  MSDS 13069 lists the hazardous ingredient as follows:

  - Hydrochloric acid.

  There are no known hazardous decomposition products listed.

  Sampling for chemical analyses is not recommended. **KLENOBOWL** would have evaporated over the years and is unlikely to pose any current health hazards.

- **LEAD**

  MSDS 1288: **LEAD**, sheet

  During 1979, extensive dismantling efforts in the loadout hood resulted in removal of the internal components, including removal of the **LEAD** shielding. No indication as to the type of shielding was found; however, it could also have been **LEAD GLASS**.

  The above MSDS lists **LEAD SHEET** as hazardous. Lead and its inorganic compounds are neurotoxins which may produce peripheral neuropathy.

Visual inspection during future decommissioning activities will establish the existence of this product.

- **MERCURY**

  MSDS 1323: **MERCURY** (by Fisher Scientific)

  MSDS 1323 states that **MERCURY** is a metal and is hazardous. Thermal decomposition products include highly toxic vapors of **MERCURY** and **MERCURY OXIDE.**

  MERCURY is utilized in instrument/electrical equipment. It is not known if **MERCURY** was used in 233-S. Visual inspection during future decommissioning activities will establish the existence of this product.

- **MINERAL OIL**

  MSDS 2629: **MINERAL OIL**

  The actual type and manufacturer of the mineral oil used are not known.

  During the 1979 D&D activities, it was suggested that a layer of **MINERAL OIL** be applied to the room surfaces prior to applying strippable coating in an attempt to reduce the adhesion of the strippable coating to the underlying original paint. A test patch of various amounts of **MINERAL OIL** was applied in the PR can storage room. There was no detectable difference in the adhesion to the underlying paint using the **MINERAL OIL.** The overlaying coats of Turco 5931 still bonded to the underlying paint and could only be removed in very small pieces.

  MINERAL OIL is not hazardous. Sampling is not recommended.

- **NITRIC ACID**

  MSDS 1384: **NITRIC ACID** (by Fisher Scientific)

  NITRIC ACID was used extensively and in various concentrations both as a part of the plutonium nitrate and the neptunium nitrate process and as flushes after completion of the process.

  During the 1966 partial decontamination for plant deactivation:

  - Internal flushing of the vessels and piping in the facility was accomplished using **57 PERCENT NITRIC ACID.** The instructions did not call for a follow-up water flush and no mention is made in the completion report of a follow-up water flush.

  - External flushing of the vessels and piping for product recovery within the greenhouse (process area) was accomplished using **10 PERCENT NITRIC ACID** followed by demineralized water.

- Flushing of the greenhouse floor and sump area for product recovery was accomplished using 10 percent **NITRIC ACID** followed by demineralized water.

- Flushing of the container loadout section of the loadout hood for product recovery was accomplished using 10 **PERCENT NITRIC ACID** and demineralized water.

The actual type and manufacturer of the **NITRIC ACID** used are not known. MSDS 1384 states that it is hazardous and thermal decomposition products may include toxic oxides or nitrogen.

Sampling is recommended to confirm the absence of this product.

- **NEPTUNIUM NITRATE**

MSDS: Not Applicable (radiologically hazardous)

In 1962, separate concentration and loadout facilities for **NEPTUNIUM NITRATE** solution were provided, as well as a new plutonium anion exchange contactor installed for achieving the desired final plutonium product purification and decontamination.

A radiological characterization of this facility is currently being conducted by Analytical Systems Laboratories.

- **OZONE**

MSDS: Not available.

In 1962, a contactor was added to process plutonium nitrate. Before the 2BP plutonium product solution was sent to the 233-S Facility from the 202-S Facility, it was stripped of hexone, treated with **OZONE** for ruthenium removal, butted with nitric acid, and finally butted with sodium nitrite or ferrous sulfamate to adjust the plutonium to the four valence. The solution was then pumped to the XAF concentrator (L-12) in the 233-S Facility.

OZONE is a hazardous substance. However, sampling for chemical analysis for **OZONE** is not recommended because the usage would be expected to absorb the majority of the **OZONE**. In addition, any residual **OZONE** should have reacted or decomposed over the years.

- **PAINT (LOOSE OR FIXED)**

MSDS 15365: **LATEX BASE FIRE RETARDANT PAINT**
MSDS 11439: **LATEX BLACK TRAFFIC PAINT**
MSDS 18060: **LATEX CONCRETE SEALANT**
MSDS 16196: **LATEX EGGSHELL ENAMEL-WHITE and LIGHT TINT**
MSDS 11441: **LATEX FLOOR PAINT**
MSDS 15599: **LATEX GLOSS and TRIM ENAMEL 74-03,04,07,08**
MSDS 15601: **LATEX HOUSE PAINT 17-3,5,7,8,9,20,21,24**
MSDS 15387: **LATEX INTERIOR SPEED PRIMER, WHITE 72-01**
MSDS 14468: **LATEX PAINTS (MULTI)**

Prior to 1979, a number of references in the historical records refer to completion of the task to remove **LOOSE PAINT** from floors and walls (loadout room, viewing room, viewing room stairwell). In each case, the area was then painted with Amercoat 33.

During the 1979 D&D activities in the can storage room and the PR can storage room, the ceilings, walls, and floors of these two rooms were cleaned of accumulated dirt, grease, and whatever slight contamination that may have been present on the surface. The only place where the original paint was removed was a hot spot of approximately one square foot in the location where the resin tank was bolted to the floor prior to removal. Eventually, the contaminated spot was removed with a commercial gel type paint stripper containing methylene chloride, methanol, and mineral spirits (no MSDS for this gel type could be located). Five coats of Turco 5931 were applied to all exposed surfaces in the airlock, the can storage room, and the PR can storage room.

During the 1979 D&D activities, chemical decontamination and fixative efforts were performed inside of the loadout hood. **WATER-BASED LATEX ENAMEL PAINT** was one of the fixatives used.

Although the internal components of the loadout hood have been removed, it is possible that **WATER-BASED LATEX ENAMEL PAINT** is present on the external and internal walls of the loadout hood, as well as the area surrounding the loadout hood. Sampling for chemical analyses is recommended.

In 1987, during stabilization activities, the bulk of the loose surface material in the stairwell and airlocks were removed. The stairwell and airlocks were then **SPRAY PAINTED** to fix the remaining contamination.

The type and manufacturer of the **LATEX** used are not known; however, numerous **LATEX** water emulsion paints are listed in MSDS 14468. These products were noncombustible water emulsion paints formulated without lead or mercury and are not hazardous.

No information as to the type of **ORIGINAL PAINT** that was used in the rooms of this facility was located so a hazardous evaluation based on historical data is not possible. Even though it was known that **LOOSE PAINT** was removed prior to 1979, sampling of the ceiling, walls, and floors is recommended. Neither the type nor manufacturer of the **ORIGINAL PAINT** used were specified and the **ORIGINAL PAINT** may be hazardous if it contained hazardous pigments or if it were lead based.

Sampling is recommended to confirm the presence of these products.

- **PAINT STRIPPER** (Commercial gel type paint stripper containing methylene chloride, methanol, and mineral spirits - Not MSDS #12362, Stripper 77A)

  MSDS: Not available.

During the 1979 D&D activities, the can storage room and the PR can storage room were cleaned with TSP. A hot spot of approximately 1 ft^2 in area was found in the location where the resin tank was bolted to the floor prior to its removal. TSP proved to be ineffective as the contamination was ingrained into the paint. Eventually, the contaminated paint was removed with a **COMMERCIAL GEL TYPE PAINT STRIPPER** containing methylene chloride, methanol, and mineral spirits.

Although an MSDS containing the above substances could not be located, paint strippers are usually hazardous. However, the chemicals in paint strippers are volatile and therefore is not expected to present any current health hazards. Sampling is not recommended.

- **PLUTONIUM NITRATE**
  PLUTONIUM HEXANITRATODIVALENT COMPLEX ANION

  MSDS: Not Applicable. Radiologically hazardous.

  PLUTONIUM NITRATE was concentrated as part of the process of this facility.

  A radiological characterization of the facility is currently being performed by Analytical Systems Laboratories.

- **POLYCHLORINATED BIPHENOLS**

  MSDS: 19093

  PCBs were initially regulated because of their detriment to the environment. Recently, they have been determined to be a suspect carcinogen which targets the liver. Because of this, it is important to keep the workplace and personnel exposure to **PCBs** "as low as reasonably achievable."

  PCBs are used in light ballasts, transformers, etc. It is not known if PCBs were used in the 233-S Facility. Visual inspection during future decommissioning activities will establish the existence of this product.

- **RADIACWASH**

  MSDS 18081: **RADIACWASH**

  During the 1979 D&D activities, chemical decontamination and fixative efforts were performed inside of the Loadout Hood. **RADIACWASH** was one of the decontamination chemicals used.

  The above MSDS lists the hazardous ingredients as follows:

  - Citric acid
  - Octyl phenol condensed
  - Tetrasodium ethylenediamine triacetate
  - Benzyldimethyl ammonium chloride, hyamine 1622

The internal components of the loadout hood were removed.

Sampling is not recommended.

- **RESIN**

MSDS: Not available. The actual type of resin used is not known, except that it was a strong base type anion exchange resin.

In 1962, the addition of a pushed bed plutonium anion exchange contactor (L-18) was the main change in the plutonium flowsheet as a result of Project CGC-913. The contactor was installed to achieve the desired final plutonium product purification and decontamination. The L-18 column was made up of an extraction section, a scrub section, a stripping section, a **RESIN** receiver section, and a reservoir section. See timeline for year 1962 for a full description of the process involving the contactor.

In 1963, a chemical reaction within the ion exchange unit caused a fire which resulted in extensive damage to the process equipment, gross alpha contamination within the process area, and general contamination spread to other portions of the facility.

Parts of the building were cleaned of gross contamination and nonsmearable alpha contamination was fixed by covering with a special paint. Six weeks later operations resumed without the ion exchange process.

During the 1979 D&D activities, the 75-gal **RESIN** storage tank located in the (can storage room or the PR can storage room???) was disconnected from its associated piping and subsequently transported to land burial.

Although the laydown trench (ion exchange trench) located parallel at the west side of 233-S Facility is not a part of the 233-S Facility, it has been included in the current radiological characterization being performed for the 233-S Facility. During the 1987 stabilization activities, the joints between the steel cover panels and along the concrete curbs were sealed with cloth tape and coated with asphalt emulsion to prevent further release of contamination from this area. It is not known if the ion exchange columns are still in the trench. The type of **RESIN** used in the columns is also not known.

RESIN is usually an organic compound based material in bead form. If **RESIN** dries out, it can become airborne very easily. **RESIN** beads are extremely small (about the size of sand particles) and can easily fall into cracks and crevices. After the cleanup as a result of the fire in 1963, operations resumed without the contactor. However, it is not known if the contactor was removed from the process area.

Sampling is recommended to verify the existence of **RESIN** in this facility.

- **RUTHENIUM**

  MSDS: .N/A. Radiologically hazardous.

  In 1962, the plutonium anion exchange contactor was installed for achieving the desired final plutonium product purification. Before the 2BP plutonium product solution was sent to the 233-S Facility, it was stripped of hexone, treated with ozone for **RUTHENIUM** removal, butted with nitric acid, and finally butted with sodium nitrite or ferrous sulfamate to adjust the plutonium to the four valence state.

  It is possible that **RUTHENIUM** exists in the process vessels and piping as well as in the process area itself. As a result of the fire in 1963, **RUTHENIUM** may exist in a number of locations within the facility. A radiological characterization of the facility is currently being performed by Analytical Systems Laboratories.

- **SILICONE RUBBER DISPERSION** by Dow Corning Corp.

  MSDS: Hanford Environmental Health Foundation (HEHF) is searching.

  In 1984, the roof of the facility was foamed using Urethane PSI-S200-30 followed by **SILICONE RUBBER DISPERSION 3-5000**. It is intended to use the same combination over the area between the 202-S and 233-S facilities, and the area over the laydown trench.

  Manufacturers literature indicates **SILICONE RUBBER DISPERSION 3-5000** to be a one component product of two contrasting colors. It is considered to be hazardous.

  Sampling is not deemed necessary. The material should be properly dispositioned when the facility is decommissioned.

- **SODIUM NITRITE**

  MSDS 1495: **SODIUM NITRITE**

  In 1962, the plutonium anion exchange contactor was installed for achieving the desired final plutonium product purification. Before the 2BP plutonium product solution was sent to the 233-S Facility, it was stripped of hexone, treated with ozone for ruthenium removal, butted with nitric acid, and finally butted with **SODIUM NITRITE** or ferrous sulfamate to adjust the plutonium to the four valence.

  According to MSDS 1495, **SODIUM NITRITE** is an organic salt and is hazardous. Thermal decomposition may yield toxic oxides of nitrogen and toxic sodium oxide.

  Sampling is recommended to verify the absence of this product.

- **STRIP COAT**

  MSDS 13294: **STRIPPABLE PROTECTIVE COATING.**

  During the 1966 partial decontamination for plant deactivation activities, **STRIP COAT** was removed from the viewing room floor.

  It is unknown if **STRIP COAT** was used in other parts of the facility.

  References in the files refer to **STRIP COAT.** No MSDS could be located for **STRIP COAT.** It is possible that the material used was **STRIPPABLE PROTECTIVE COATING.**

  MSDS 13294 lists the hazardous ingredients as follows:

  - Toluene
  - Methyl ethyl ketone
  - Acetone
  - Dichlorodifluoromethane (Freon 12) - Propellant

  The ingredients listed above are all volatile and should not pose a current health hazard; therefore, sampling is not considered necessary.

- **TRISODIUM PHOSPHATE**

  MSDS 1509: **TRISODIUM PHOSPHATE CRYSTALS**

  During the 1979 D&D activities, the can storage room and the PR can storage room were cleaned with **TSP.** Decontamination began on the room's ceilings, then proceeded down the walls to the floors. The **TSP** cleaning solution successfully removed the accumulated dirt, grease, and whatever slight contamination that may have been present on the surface.

  MSDS 1509 lists **TSP** as a hazardous phosphate salt. There are no hazardous decomposition products.

  TSP was used as a cleaning solution. The residual concentration remaining on the walls is considered negligible and should not currently pose a health hazard. Sampling is not recommended.

- **TURCO WO-2 (5 percent aqueous solution)**

  MSDS 20424: **TURCO W.O. 2**

  During the 1966 partial decontamination for plant deactivation activities, the following was accomplished:

  - Surfaces inside the Loadout Hood were swabbed with a **5 percent AQUEOUS SOLUTION OF TURCO WO2,** Wedac, or approved substitute to remove dust, lint, and gross contamination.

  - The L-6 sampler box was flushed with a small quantity of 10 percent nitric acid. The surrounding area was then swabbed with a **5 percent AQUEOUS SOLUTION OF TURCO WO-2,** Wedac, or approved equivalent.

- The airlocks were decontaminated with 5 percent AQUEOUS SOLUTION OF TURCO WO-2 or Wedac.

MSDS 20424 lists TURCO WO-2 as a hazardous substance containing phosphoric acid. It is in the corrosive classification. There are no hazardous decomposition products.

The residual concentration remaining in the facility is considered negligible and should not currently pose a health hazard. Therefore, sampling for chemical analyses is not recommended.

- **TURCO DECON 4306-C**

MSDS 21977: **TURCO DECON 4306-C**

During the 1979 D&D activities, chemical decontamination and fixative efforts were performed inside of the loadout hood. **TURCO DECON 4306-C** was one of the decontamination chemicals used.

MSDS 21977 lists two ingredients in the hazardous information section. Both are listed because of irritation properties only:

- Sulfamic acid
- Sodium disulfate

It is an off-white granular powder and is listed as corrosive in the hazardous classification. It has no hazardous decomposition products.

Although the internal components of the loadout hood have been removed, it is possible that **TURCO DECON 4306-C** is present on the external and internal walls of the loadout hood as well as the area surrounding the hood. However, the residual concentration remaining in the facility is considered negligible and should not currently pose a health hazard. Sampling for chemical analysis is not recommended.

- **TURCO DECON 4306-D**

MSDS 12556: **TURCO DECON 4306-D**

TURCO DECON 4306-D was also used as one of the decontamination chemicals on the internal components of the loadout hood.

MSDS 12556 lists two ingredients in the hazardous information section. Both are listed because of irritation properties only:

- Sulfamic acid
- Sodium bisulfate

It is an off-white granular powder and is listed as corrosive in the hazardous classification. It has no hazardous decomposition products.

Even though some of the **TURCO DECON 4306-D** may remain inside the hood, the residual concentration remaining is considered negligible and should not currently pose a health hazard. Sampling for chemical analysis is not recommended.

- **TURCO CONTAM-AFFIX**

  MSDS 13335: **TURCO CONTAM-AFFIX**

  During the 1979 D&D activities, chemical decontamination and fixative efforts were performed inside of the loadout hood. **TURCO CONTAM-AFFIX** was one of the decontamination chemicals used.

  MSDS 13335 lists the hazardous ingredients as follows:

  - Toluene
  - n-Butyl alcohol
  - Isopropyl alcohol
  - Acetone

  Hazardous decomposition products are toxic oxides of carbon and nitrogen, carbon monoxide.

  Some **TURCO CONTAM-AFFIX** may remain inside the hood; however, the residual concentration remaining is considered negligible and should not currently pose a health hazard.

- **TURCO 5931 (WHITE)** - A strippable coating.

  MSDS 12553: **TURCO 5931-C** (same as Turco 5931).

  During the 1979 D&D activities, five coats of **TURCO 5931** were applied to all exposed surfaces in the airlock, the can storage room and the PR can storage room.

  MSDS 12553 lists the hazardous ingredients as follows:

  - 2-Butoxy ethanol
  - Dioctyl phthalate
  - Morpholine
  - Mineral oil

  The hazardous decomposition products portion of the MSDS is not filled out. A respirator with a mechanical filter for mist for dust conditions is required for respiratory protection.

  Visual inspection during future decommissioning activities will establish the existence of this product.

- **URETHANE PSI-S200-30** by Polythane Systems Inc.

  MSDS: (HEHF searching.)

  Verbal communications indicate that, in 1984, the exhaust ducts and the facility roof were foamed with **URETHANE PSI-S200-30**. The type of material used was not specified but it was likely a **URETHANE** product.

  Manufacturer's information indicates that **URETHANE PSI-S200-30** is a two component system composed of a polymeric isocyanate "A" component and a fluorocarbon-blown "B" component. It is a hazardous product.

  Visual inspection during future decommissioning activities will establish the existence of this product.

- **WEDAC**

  MSDS 13365: **WEDAC**

  During the 1966 partial decontamination for plant deactivation activities, the following was accomplished:

  - Surfaces inside the Loadout Hood were swabbed with a 5 percent aqueous solution of Turco WO-2, **WEDAC**, or approved substitute to remove dust, lint, and gross contamination.

  - The L-6 sampler box was flushed with a small quantity of 10 percent nitric acid. The surrounding area was then swabbed with a 5 percent aqueous solution of Turco WO-2, **WEDAC**, or approved equivalent.

  - The airlocks were decontaminated with 5 percent aqueous solution of Turco WO-2 or **WEDAC**.

  MSDS 13365 lists hazardous mixtures of other liquids, solids, or gases as follows:

  - Phosphoric acid

  WEDAC is a light amber liquid with a mild odor. There are no hazardous decomposition products. It is noted that the material in contact with active metals can liberate hydrogen.

  Any residual concentration remaining is considered negligible and would have reacted or decomposed. It is therefore considered that **WEDAC** would not currently pose a health hazard and sampling is recommended.

5. SUMMARY

This report identifies chemicals that were historically used in the 233-S Facility. The list of chemicals cannot be considered all-inclusive because the search for these chemicals was based only on the available records located in Decommissioning Engineering.

It must be emphasized that the chemicals historically used in this facility do not represent the current chemical inventory. Over the years, much flushing of the process lines and equipment was performed, some of the chemicals would have evaporated or decomposed, some of the chemicals were used in extremely minute quantities (such as a test patch), and some of the equipment containing some of the chemicals were removed.

6. ACTION PLAN

6.1. FUTURE SAMPLING

Where indicated in the list of identified chemicals (Section 4), it is recommended that sampling and chemical analyses be performed prior to initiation of future decommissioning of this facility. In addition, it is recommended that sampling and chemical analyses be performed on all process equipment and process lines for chemicals identified as those chemicals coming into the 233-S Facility from the 202-S Facility. Sampling should be performed following EPA #SW-846, "Test Methods for Evaluating Solid Waste Physical/Chemical Methods" (EPA 1986).

6.2. TECHNICAL ISSUES

It is recommended that additional search of records be performed. This report is based on available records located in the Decommissioning Engineering files. More information could be obtained by performing a complete library search for older documents. There are some slight discrepancies in information regarding the process chemicals coming from the 202-S Facility into the 233-S Facility. As an example, it is unclear as to whether **sodium nitrite** or **sulfamic acid** was used.

7. REFERENCES

Beckstrom, John F., 1988, *Physical Status and Post Stabilization Activities Report for the 233-S Building*, SD-DD-TI-028 Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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EPA, 1986, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846, 3rd Edition, EPA-600/4-79-019, U.S. Environmental Protection Agency, Washington, District of Columbia.

Kover, K., 1978, "233-S Environmental Survey," Internal Memo 72330-78-169, Rockwell Hanford Operations, Richland, Washington.

Leach, K. S., 1955, "Informational Manual," General Electric - Hanford Atomic Products Operations, Richland, Washington.

RHO, 1979a, *233-S Building Decontamination and Decommissioning Safety Assessment Document*, RHO-CD-658 Rev. 1, Rockwell Hanford Operations, Richland, Washington.

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RHO, 1980a, *Decontamination and Dismantling of the 233-S Loadout Hood Engineering Report*, DO104ER0601 Rev. 0, Rockwell Hanford Operations, Richland, Washington.

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RHO, 1980c, *Pipe Gallery and Control Room Characterization Engineering Report*, DO104ER0401 Rev. 0, Rockwell Hanford Operations, Richland, Washington.

RHO, 1981a, *233 - D&D Operations Safety Requirements*, DO104AR0001 Rev. 0, Rockwell Hanford Operations, Richland, Washington.

RHO, 1982, *Rockwell Retired Contaminated Facility Listing and Description*, SD-DD-FL-001, Rockwell Hanford Operations, Richland, Washington.

WHC, 1990, *Characterization of 233-S Facility: Measurements Plan*, WHC-SD-CP-TP-055 Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Yoder, R. A., 1962, "233-S Information Manual (Project CGC-913)," Rockwell Hanford Operations, Richland, Washington.

8. BIBLIOGRAPHY

Owens, Kirk W. and Jack C. Sabin, 1984, *Long-Range Decommissioning Plan for Rockwell Hanford Operations Surplus Facilities Management Program*, RHO-WM-PL-10, Rockwell Hanford Operations, Richland, Washington.

RHO, 1979a, *Technology Development Interim Engineering Report*, DO104ER1002 Rev. 0, Rockwell Hanford Operations, Richland, Washington.

RHO, 1979b, *Activity Requirements IX: Process Hood Dismantling*, DO104AR0901 Rev. 0, Rockwell Hanford Operations, Richland, Washington.

RHO, 1981, *Engineering Study - 233-S HVAC Shutdown*, SD-RE-ES-003 Rev. 0, Rockwell Hanford Operations, Richland, Washington.

Unknown, 1964, "233-S Building," all other information is unknown.

WHC, 1988, *Retired Surplus Facilities Programs Facilities Listing and Descriptions*, WHC-SP-0331, Westinghouse Hanford Company, Richland, Washington.

WHC, 1990, "Draft FY 1991, Scoping Document - 233-S Engineering Study," Westinghouse Hanford Company, Richland, Washington.

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APPENDIX A

MATERIAL SAFETY DATA SHEETS

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LISTING OF THE MATERIAL SAFETY DATA SHEETS

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MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2112
1,1,2,2-TETRABROMOETHANE

MANUFACTURER INFORMATION

Product Trade Name: 1,1,2,2-TETRABROMOETHANE
MSDS Date: 05/01/89

J. T. Baker
222 Red School Lane
Phillipsburg, NJ 08865
(800) JTBAKER
(800) 582-2537

EFFECTIVE: 05/01/89
ISSUED: 02/07/92

EMERGENCY Phone: (908) 859-2151 24 Hour
(800) 424-9300 CHEMTREC
(800) 424-8802 National Response Center

SECTION I - MATERIAL IDENTIFICATION

Mfg's Product ID: 9443,V323

CAS Number: 79-27-6

Formula: BR2CHCHBR2

NIOSH RTECS Number: KI8225000

Chemical Family: BROMINATED HYDROCARBONS

OTHER DESIGNATIONS (Synonyms) --------
1,1,2,2-TETRABROMOETHANE
ACETYLENE TETRABROMIDE
TETRABROMOACETYLENE

Unidentified Numbers on MSDS: T0494 M03

Additional Information: BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 2 MODERATE
FLAMMABILITY - 1 SLIGHT
REACTIVITY - 0 NONE
CONTACT - 2 MODERATE

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2112
1,1,2,2-TETRABROMOETHANE

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Ingredient Name	*CAS Number*	*Percent*	*Exposure Limits*
1,1,2, 2-TETRABROMOETHANE	*79-27-6*	*90-100*	*PEL: 1 PPM* *TLV: 1 PPM*

PRODUCT Exposure Limits: THRESHOLD LIMIT VALUE (TLV/TWA): 15 MG/M3 (1 PPM)

THE TLV FOR 1,1,2,2-TETRABROMOETHANE IS LISTED UNDER ACETYLENE TETRABROMIDE.

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 14 MG/M3 (1 PPM)

THE PEL FOR 1,1,2,2-TETRABROMOETHANE IS LISTED UNDER ACETYLENE TETRABROMIDE.

SECTION III - PHYSICAL DATA

Appearance and Odor: YELLOW LIQUID. CAMPHOR-LIKE ODOR.
Product Uses: LABORATORY REAGENT

Boiling Point: 135 C (275 F) (AT 760 MMHG)
Vapor Pressure: 1 (20 C) (mmHg)
Vapor Density: 11.9 (AIR=1)
Water Solubility: NEGLIGIBLE (<0.1%)
pH: NOT APPLICABLE OR NOT AVAILABLE
Odor Threshold: NOT APPLICABLE OR NOT AVAILABLE
Specific Gravity: 2.96 (H2O=1)
Melting Point: 0 C (32 F) (AT 760 MMHG)
Evaporation Rate: NOT APPLICABLE OR NOT AVAILABLE
Percent Volatile: 100 (21 C) BY VOLUME
Molecular Weight: 345.65
Physical State: LIQUID
Oil/Water Coeff.: NOT APPLICABLE OR NOT AVAILABLE

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2112
1,1,2,2-TETRABROMOETHANE

SECTION IV - FIRE AND EXPLOSION DATA

National Fire Protection Association Hazard Codes
Hazard Ratings: 0-None --> 4-Extreme

Health: 3 Fire: 0 Reactivity: 1

Flammable Limits:

LEL(%): NOT APPLICABLE OR NOT AVAILABLE
UEL(%): NOT APPLICABLE OR NOT AVAILABLE

Autoignition: NOT APPLICABLE OR NOT AVAILABLE

Flash Point (Method): NOT APPLICABLE OR NOT AVAILABLE

Extinguishing Media: USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

Special Fire Fighting Procedures: FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

Unusual Fire and Explosion Hazards: NONE IDENTIFIED.

Harmful Combustion Products: TOXIC GASES PRODUCED: HYDROGEN BROMIDE, CARBON MONOXIDE, CARBON DIOXIDE

Sensitivity to Impact: NONE IDENTIFIED.

Sensitivity to Static Discharge: NONE IDENTIFIED.

SECTION V - REACTIVITY DATA

Stability: STABLE

Hazardous Polymerization: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

Incompatabilities/Materials to Avoid: STRONG OXIDIZING AGENTS,

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2112
1,1,2,2-TETRABROMOETHANE

--- SECTION V - REACTIVITY DATA continued from page 3 ---

ALUMINUM, MAGNESIUM, ALKALI METALS

Hazardous Decomposition Products: HYDROGEN BROMIDE

SECTION VI - HEALTH HAZARDS

Effects of Exposure/Overexposure:
INHALATION: IRRITATION OF NOSE AND THROAT, NAUSEA, VOMITING

SKIN CONTACT: IRRITATION

EYE CONTACT: IRRITATION

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NONE IDENTIFIED

Chronic: LIVER DAMAGE

Medical Conditions Aggravated: NONE IDENTIFIED

Routes of Entry: INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

Target Organs: EYES, RESPIRATORY SYSTEM, LIVER

Cancer Statement: CARCINOGENICITY:
NTP: NO
IARC: NO
Z LIST: NO
OSHA REG: NO

CARCINOGENICITY: NONE IDENTIFIED.

Toxicity Data: TOXICITY OF COMPONENTS
ORAL RABBIT LD50 FOR 1,1,2,2-TETRABROMOETHANE ... 400 MG/KG

REPRODUCTIVE EFFECTS: NONE IDENTIFIED.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2112
1,1,2,2-TETRABROMOETHANE

SECTION VII - FIRST AID PROCEDURES

Eyes: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

Skin: IN CASE OF CONTACT, FLUSH SKIN WITH WATER.

Inhalation: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

Ingestion: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: SAF-T-DATA (TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

Personal Protection ----------

Respirator: A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

Eye Protection: SAFETY GOGGLES ARE RECOMMENDED.

Gloves: RUBBER GLOVES ARE RECOMMENDED.

Other Protective Clothing & Equipment: SKIN PROTECTION: UNIFORM AND APRON ARE RECOMMENDED.

WORKPLACE CONTROLS ----------

Ventilation: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2112
1,1,2,2-TETRABROMOETHANE

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

Waste Management/Disposal: DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

SARA Title III / CERCLA: ACUTE: YES
CHRONIC: YES
FLAMMABILITY: NO
PRESSURE: NO
REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: NO

SARA 313 TOXIC CHEMICALS: NO

UN No: D.O.T. UN: UN2504

INTERNATIONAL (I.M.O.) UN: UN2504

AIR (I.C.A.O.) UN: UN2504

DOT Hazard Class: 6.1
DOT Shipping Name: TETRABROMOETHANE
DOT Labels/Placards: HARMFUL - STOW AWAY FROM FOOD STUFFS

Other Hazard Class: INTERNATIONAL (I.M.O.): 6.1

AIR (I.C.A.O.): 6.1
Other Shipping Name: INTERNATIONAL (I.M.O.): TETRABROMOETHANE

AIR (I.C.A.O.): TETRABROMOETHANE
Other Labels/Placards: INTERNATIONAL (I.M.O.) LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS

AIR (I.C.A.O.) LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2112
1,1,2,2-TETRABROMOETHANE

--- SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING continued from page 6 --

Special Shipping: U.S. CUSTOMS HARMONIZATION NUMBER: 29033005003

Additional Information: D.O.T. PACKAGING GROUP: III

INTERNATIONAL (I.M.O.) I.M.O. PAGE: 6263

INTERNATIONAL (I.M.O.) PACKAGING GROUP: III

INTERNATIONAL (I.M.O.) MARINE POLLUTANTS: YES

INTERNATIONAL (I.M.O.) REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.) PACKAGING GROUP: III

AIR (I.C.A.O.) REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 172.3== SEE SHIPPER REQUIREMENTS 49 CFR 172.3 AND EMPLOYEE TRAINING 49 CFR 173.1.

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

LABELS: PRECAUTIONARY LABELING

BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 2 MODERATE
FLAMMABILITY - 1 SLIGHT
REACTIVITY - 0 NONE
CONTACT - 2 MODERATE

LABORATORY PROTECTIVE EQUIPMENT: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING:

WARNING: CAUSES IRRITATION. HARMFUL IF SWALLOWED. AVOID CONTACT WITH

MATERIAL SAFETY DATA SHEET

J. T. Baker.

Hanford's MSDS No.: 2112
1,1,2,2-TETRABROMOETHANE

--- SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS continued from page 7 ---

EYES, SKIN, CLOTHING. KEEP IN TIGHTLY CLOSED CONTAINER. WASH THOROUGHLY AFTER HANDLING.

INTERNATIONAL LABELING:

VERY TOXIC BY INHALATION. IRRITATING TO EYES. KEEP LOCKED UP. AVOID CONTACT WITH SKIN. TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING. IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

SAF-T-DATA (TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

Additional MSDS Information: COPYRIGHT 1992 J T BAKER INC.

(TM) TRADEMARKS OF J T BAKER INC.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

Regulatory Information ----------

TSCA: TSCA INVENTORY: YES

Manufacturer's Disclaimer: THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE. THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. NOTE: CHEMTREC, CANUTEC, AND

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2112
1,1,2,2-TETRABROMOETHANE

NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

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MATERIAL SAFETY DATA SHEET

American Cyanamid Co.

Hanford's MSDS No.: 20319
AEROSPRAY (R) 70A BINDER

MANUFACTURER INFORMATION

Product Trade Name: AEROSPRAY (R) 70A BINDER
MSDS Date: 06/26/92

American Cyanamid Co.
One Cyanamid Plaza
Wayne, NJ 07470
(201) 831-2000

EMERGENCY Phone: (800) 424-9300 CHEMTREC

Prepared by: Marvin A. Friedman, Ph.D.,
Director
Toxicology And Product Stewardship

SECTION I - MATERIAL IDENTIFICATION

Mfg's MSDS ID: 5623-02

Formula: Mixture

Chemical Family: Polyvinyl Acetate Emulsion

OTHER DESIGNATIONS (Synonyms) --------
AEROSPRAY (R) 70A BINDER
AEROSPRAY 70A BINDER
70A BINDER
POLYVINYL ACETATE

Additional Information: Statements of Hazards: No Warning Statement.

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

PRODUCT Exposure Limits: No Permissible Exposure Limits (PEL/TLV) have been established by OSHA or ACGIH.

MATERIAL SAFETY DATA SHEET

American Cyanamid Co.

Hanford's MSDS No.: 20319
AEROSPRAY (R) 70A BINDER

SECTION III - PHYSICAL DATA

Appearance and Odor: White milky fluid, mild odor.
Boiling Point: Not Available
Vapor Pressure: Not Available
Vapor Density: Not Available
Water Solubility: Dilutable in all proportions.
pH: 5.0
Specific Gravity: 1.0 - 1.2
Melting Point: Not Available
Evaporation Rate: < 1
Percent Volatile: 40 water (by wt)
Molecular Weight: Mixture

Additional Information: Saturation in Air (By Vol): Not Available

SECTION IV - FIRE AND EXPLOSION DATA

National Fire Protection Association Hazard Codes
Hazard Ratings: 0-None --> 4-Extreme

Health: 1 Fire: 1 Reactivity: 0 Special: -

Flammable Limits: Not Available

Autoignition: Not Available

Flash Point (Method): > 200°F / >96.3°C (Closed Cup)

Extinguishing Media: Use water spray, carbon dioxide or dry chemical to extinguish fires.

Special Fire Fighting Procedures: Use water to keep containers cool. Wear self-contained, positive pressure breathing apparatus.

Additional Information: Decomposition Temp.: Not Available.

MATERIAL SAFETY DATA SHEET

American Cyanamid Co.

Hanford's MSDS No.: 20319
AEROSPRAY (R) 70A BINDER

SECTION V - REACTIVITY DATA

Stability: Stable.
Conditions to Avoid: None known.

Hazardous Polymerization: Will not occur.
Conditions to Avoid: None known.

Incompatabilities/Materials to Avoid: None known.

Hazardous Decomposition Products: Thermal decomposition or combustion may produce carbon dioxide and carbon monoxide.

SECTION VI - HEALTH HAZARDS

Toxicity Data: Estimated Acute Oral (rat) LD_{50}: > 5,000 mg/kg.

Estimated Acute Dermal (rabbit) LD_{50}: > 2,000 mg/kg.

Estimated 4-hour inhalation (rat) LC_{50}: > 2,500 ppm.

Toxicological information on the OSHA regulated components of this product is as follows: Not Applicable.

SECTION VII - FIRST AID PROCEDURES

Eyes: In case of eye contact, immediately irrigate with plenty of water for 15 minutes.

Skin: In case of skin contact, wash affected areas of skin with soap and water.

MATERIAL SAFETY DATA SHEET

American Cyanamid Co.

Hanford's MSDS No.: 20319
AEROSPRAY (R) 70A BINDER

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: None.

Personal Protection ----------

Respirator: For operations where inhalation exposure can occur, a NIOSH approved respirator recommended by an industrial hygienist may be necessary.

Eye Protection: For operations where eye or face contact can occur, wear eye protection such as chemical splash-proof goggles or face shield.

Gloves: Avoid unnecessary skin contact. Impervious gloves is recommended to prevent skin contact.

Other Protective Clothing & Equipment: Avoid unnecessary skin contact, Impervious apron is recommended to prevent skin contact.

WORKPLACE CONTROLS ----------

Work Hygienic Practices: Engineering controls are not usually necessary if good hygiene practices are followed. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: Cover spills with some inert absorbent; sweep up and place in a waste disposal container. Flush area with water.

Waste Management/Disposal: Disposal must be made in accordance with applicable governmental regulations.

Environmental Information: No aquatic LC_{50}, BOD or COD data available. Octanol/H_2O Partition Coef.: Not Available.

SARA Title III / CERCLA: This product does not contain any components regulated or subject to reporting requirements of Section 313 of Title III and of 40 CFR 372 or subject to other EPA regulations.

Product Classification Under Section 311 of SARA: Not Applicable

MATERIAL SAFETY DATA SHEET

American Cyanamid Co.

Hanford's MSDS No.: 20319
AEROSPRAY (R) 70A BINDER

--- SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING continued from page 4 --

under SARA Title III.

UN No: DOT: Not Applicable
IMO: Not Applicable
ICAO/IATA: Not Applicable
Transport Canada: Not Applicable

DOT Hazard Class: Not Applicable
DOT Shipping Name: Not Applicable/Not Regulated
DOT Labels/Placards: None Required

Other Hazard Class: IMO: Not Applicable
ICAO/IATA: Not Applicable
Transport Canada: Not Applicable
Other Shipping Name: IMO: Not Applicable/Not Regulated
ICAO/IATA: Not Applicable/Not Regulated
Transport Canada: Not Applicable/Not Regulated
Other Labels/Placards: IMO: None Required
ICAO/IATA: None Required
Transport Canada: None Required

Special Shipping: DOT:
Hazardous Substances (Product Reportable Quantity): Not Applicable
Packing Group: Not Applicable
IMDG Page: Not Applicable

IMO:
Hazardous Substances (Product Reportable Quantity): Not Applicable
Packing Group: Not Applicable
IMDG Page: Not Applicable

ICAO/IATA:
Subsidiary Class: Not Applicable
Packing Group: Not Applicable
Packing Instr: Passenger - Not Applicable
Cargo - Not Applicable
Max Net Qty: Passenger -Not Applicable
Cargo - Not Applicable

Transport Canada
Subsidiary Class: Not Applicable
Packing Group: Not Applicable
Packing Instr: Not Applicable
Max Net Qty: Not Applicable

Additional Transport Information: Technical Name (N.O.S.): Not

MATERIAL SAFETY DATA SHEET

American Cyanamid Co.

Hanford's MSDS No.: 20319
AEROSPRAY (R) 70A BINDER

applicable

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

Regulatory Information ----------

TSCA: This product is manufactured in compliance with all provisions of the Toxic Substances Control Act, 15 U.S.C.

Other Regulatory: Canada DSL: Components of this product have been reported to Environment Canada in accordance with subsection 25 of the Canadian Environmental Protection Act and are included on the Domestic Substances List.

EEC EINECS: The EEC inventory information for this products MSDS has not been established yet.

Additional Information: Reason for Issue: New Format.

Manufacturer's Disclaimer: This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation and verification. Before using any product read its label.

MATERIAL SAFETY DATA SHEET

An RPM Company
Carboline Company

Hanford's MSDS No.: 20758
ALARA 1146 CAVITY DECON (5301S1NL)

MANUFACTURER INFORMATION

Product Trade Name: ALARA 1146 CAVITY DECON (5301S1NL)
MSDS Date: 12/03/91

An RPM Company
Carboline Company
350 Hanley Industrial Court
St. Louis, MO 63144
(314) 644-1000

Date: 12/03/91
Replaces: 11/28/90 - VLF

EMERGENCY Phone: (800) 424-9300 CHEMTREC
(412) 681-6669 Pittsburgh Poison Control Center

SECTION I - MATERIAL IDENTIFICATION

OTHER DESIGNATIONS (Synonyms) --------
ALARA 1146 CAVITY DECON (5301S1NL)
ALARA 1146 CAVITY DECON

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Additional Information: CONTAINS NO HAZARDOUS INGREDIENTS

Color Pigment Mixture may contain Iron Oxides, Titanium Dioxide, Carbon Black, and other particulates not otherwise regulated in varying amounts depending on color of product.

SECTION III - PHYSICAL DATA

Boiling Point: NA
Vapor Density: NA
Pounds/gallon: 8.9 (U.S.)
Evaporation Rate: NA
Percent Volatile: 54 (by wt)
59 (by vol)
VOC: The product has no volatile organic components.

MATERIAL SAFETY DATA SHEET

An RPM Company
Carboline Company

Hanford's MSDS No.: 20756
ALARA 1146 CAVITY DECON (5301S1NL)

--- SECTION III - PHYSICAL DATA continued from page 1 ---

SECTION IV - FIRE AND EXPLOSION DATA

Flammable Class: OSHA - Not Regulated

Flammable Limits:

LEL(%): NA
UEL(%): NA

Flash Point (Method): NA (Pensky-Martens/Closed Cup)

Extinguishing Media: Dry Chemical, Foam, Carbon Dioxide, Water Fog.

Special Fire Fighting Procedures: None

Unusual Fire and Explosion Hazards: None

SECTION V - REACTIVITY DATA

Stability: This product is stable under normal storage conditions.

Hazardous Polymerization: Will not occur under normal conditions.

CONDITIONS TO AVOID: None

Incompatabilities/Materials to Avoid: None

Hazardous Decomposition Products: Carbon monoxide and unidentified organic compounds.

MATERIAL SAFETY DATA SHEET

An RPM Company
Carboline Company

Hanford's MSDS No.: 20758
ALARA 1146 CAVITY DECON (5301S1NL)

SECTION VI - HEALTH HAZARDS

Health Hazards: INHALATION: Overexposure may be irritating to mucous membranes.

CONTACT: May cause eye and skin irritation.

Medical Conditions Aggravated: If you have a condition that could be aggravated by exposure to dust see a physician prior to use.

Routes of Entry: Primary: Inhalation, Dermal, Ingestion

SECTION VII - FIRST AID PROCEDURES

FIRST AID Procedures: When exposed always get medical attention.

Eyes: Flush with water for 15 minutes.

Skin: Wash with soap and water. Remove contaminated clothing and clean before reuse.

Inhalation: Remove to fresh air. Provide oxygen if breathing is difficult. Use artificial respiration if not breathing. Get medical attention.

Ingestion: IF SWALLOWED, DO NOT INDUCE VOMITING!! Always get medical attention.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: Store in cool, dry place with adequate ventilation.

Other Precautions: Do not weld, heat, or drill on full or empty containers.

Personal Protection ----------
Respirator: Use only with ventilation to keep levels below exposure guidelines (SECTION II - INGREDIENTS AND EXPOSURE LIMITS). Use (OSHA) approved air-purifying respirator when necessary.

MATERIAL SAFETY DATA SHEET

An RPM Company
Carboline Company

Hanford's MSDS No.: 20758
ALARA 1146 CAVITY DECON (5301S1NL)

- SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES cont'd from page 3 --

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Gloves: Recommend impervious gloves to avoid skin contact.

Other Protective Clothing & Equipment: Recommend impervious clothing to avoid skin contact.

WORKPLACE CONTROLS ----------

Ventilation: Use explosion-proof ventilation as required.

Work Hygienic Practices: Wash with soap and water before eating, drinking, or using toilet facilities. Launder contaminated clothing before reuse.

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: This product is a designed strippable coating. If a leak or spill occurs in an area contain the material. Allow to dry or cure. The material presents no fire hazard or health hazard. The material may then be stripped and discarded as non-hazardous waste.

Waste Management/Disposal: Discarded as non-hazardous waste.

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

LABELS: FOR INDUSTRIAL USE ONLY

Manufacturer's Disclaimer: The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, local laws and regulations.

MATERIAL SAFETY DATA SHEET

An RPM Company
Carboline Company

Hanford's MSDS No.: 14254
ALARA 1146 STRIPPABLE COATING
(5303S9NL)

MANUFACTURER INFORMATION

Product Trade Name: ALARA 1146 STRIPPABLE COATING (5303S9NL)
MSDS Date: 11/29/90

An RPM Company
Carboline Company
350 Hanley Industrial Court
St. Louis, MO 63144
(314) 644-1000

Date: 11/29/90
Replaces: 07/13/89 - VLF

EMERGENCY Phone: (800) 424-9300 CHEMTREC
(412) 681-6669 Pittsburgh Poison Control Center

SECTION I - MATERIAL IDENTIFICATION

OTHER DESIGNATIONS (Synonyms) --------
ALARA 1146 STRIPPABLE COATING (5303S9NL)

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Additional Information: Color Pigment Mixture may contain Iron Oxides, Titanium Dioxide, Carbon Black, and other particulates not otherwise regulated in varying amounts depending on color of product.

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: Not Applicable
Pounds/gallon: 8.9
Percent Volatile: 54 (by Weight)
59 (by Volume)
VOC: The product has no volatile organic components.

MATERIAL SAFETY DATA SHEET

An RPM Company
Carboline Company

Hanford's MSDS No.: 14254
ALARA 1146 STRIPPABLE COATING
(5303S9NL)

SECTION IV - FIRE AND EXPLOSION DATA

Flammable Class: OSHA - Not Regulated

Flammable Limits:

LEL(%): Not Applicable
UEL(%): Not Applicable

Flash Point (Method): Not Applicable (Pensky-Martens Closed Cup)

Extinguishing Media: Dry Chemical, Foam, Carbon Dioxide, Water Fog.

Special Fire Fighting Procedures: None

Unusual Fire and Explosion Hazards: None

SECTION V - REACTIVITY DATA

Stability: This product is stable under normal storage conditions.

Hazardous Polymerization: Will not occur under normal conditions.

CONDITIONS TO AVOID: None

Incompatabilities/Materials to Avoid: None

Hazardous Decomposition Products: Carbon monoxide and unidentified organic compounds.

MATERIAL SAFETY DATA SHEET

An RPM Company
Carboline Company

Hanford's MSDS No.: 14254
ALARA 1146 STRIPPABLE COATING
(5303S9NL)

SECTION VI - HEALTH HAZARDS

Effects of Exposure/Overexposure:
INHALATION: Overexposure may be irritating to mucous membranes.

CONTACT: May cause eye and skin irritation.

Medical Conditions Aggravated: If you have a condition that could be aggravated by exposure to dust see a physician prior to use.

Routes of Entry: Primary: Inhalation, Dermal, Ingestion

SECTION VII - FIRST AID PROCEDURES

FIRST AID Procedures: When exposed always get medical attention.

Eyes: Flush with water for 15 minutes.

Skin: Wash with soap and water. Remove contaminated clothing and clean before reuse.

Inhalation: Remove to fresh air. Provide oxygen if breathing is difficult. Use artificial respiration if not breathing. Get medical attention.

Ingestion: IF SWALLOWED, DO NOT INDUCE VOMITING!! Always get medical attention.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: Store in cool, dry place with adequate ventilation.

Other Precautions: Do not weld, heat, or drill on full or empty containers.

Personal Protection ----------
Respirator: Use only with ventilation to keep lwvels below exposure guidelines (INGREDIENTS Section II). Use (OSHA) approved

MATERIAL SAFETY DATA SHEET

An RPM Company
Carboline Company

Hanford's MSDS No.: 1425
ALARA 1146 STRIPPABLE COATING
(5303S9NL)

- SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES cont'd from page 3 -

air-purifying respirator when necessary.

Eye Protection: Recommend safety glasses with side shields or chemical goggles to avoid eye contact.

Gloves: Recommend impervious gloves to avoid skin contact.

Other Protective Clothing & Equipment: Recommend impervious clothing to avoid skin contact.

WORKPLACE CONTROLS ----------

Ventilation: Use explosion-proof ventilation as required.

Work Hygienic Practices: Wash with soap and water before eating, drinking, or using toilet facilities. Launder contaminated clothing before reuse.

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: This product is a designed strippable coating. If a leak or spill occurs in an area contain the material. Allow to dry or cure. The material presents no fire hazard or health hazard. The material may then be stripped and discarded as non-hazardous waste.

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

LABELS: FOR INDUSTRIAL USE ONLY

Manufacturer's Disclaimer: THE INFORMATION CONTAINED HEREIN IS, TO THE BEST OF OUR KNOWLEDGE AND BELIEF, ACCURATE. HOWEVER, SINCE THE CONDITIONS OF HANDLING AND USE ARE BEYOND OUR CONTROL, WE MAKE NO GUARANTEE OF RESULTS, AND ASSUME NO LIABILITY FOR DAMAGES INCURRED BY USE OF THIS MATERIAL. IT IS THE RESPONSIBILITY OF THE USER TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, LOCAL LAWS AND REGULATIONS.

XPCA 1-85 (OSHA 174)

MATERIAL SAFETY DATA SHEET
FOR COATINGS, RESINS AND RELATED MATERIALS

MSDS #10288

Ameron Protective Coatings
201 North Berry Street
Brea, CA 92621

Information: (714) 529-1951 (M. Kline)
Emergency: (800) 424-9300 (CHEMTREC)
Preparation Date: 03-10-89
Supersedes: 06-15-85

SECTION I -- PRODUCT IDENTIFICATION

TRADE NAME: AMERCOAT
PRODUCT CLASS: VINYL COPOLYMER
PRODUCT NO: 33

FOR INDUSTRIAL USE ONLY
HEALTH: WARNING

SECTION II -- HAZARDOUS INGREDIENTS

INGREDIENTS	CAS NO.	% BY WT	EXPOSURE LIMITS OSHA PEL ppm	OSHA PEL mg/m3	ACGIH TLV (TWA) ppm	ACGIH TLV (TWA) mg/m3	VP mm @ 68 F	TOXICITY LD50 g/kg	TOXICITY LC50 ppm
METHYL ISOBUTYL KETONE (SARA,CERCLA)	108-10-1	34.47	50	205	50	205	15	2	4000
TOLUENE (SARA,CERCLA)	108-88-3	30.99	200	375 (BENZENE** @ 0-900 PPM)	100	375	24	5	8000
XYLENE (SARA)	1330-20-7	26.77	100	435 (BENZENE** @ 0-900 PPM)	100	435	6.6	4.3	6700
CHLORINATED PARAFFIN	61788-76-9	<15	dna	dna (AS PARAFFIN WAX FUME)	dna	2.	na	50	dna
* TITANIUM DIOXIDE	13463-67-7	<15	dna	10 (AS TI, POSSIBLE IMPURITIES, <10% SILICA [AMORPHOUS], <6% ALUMINUM HYDROXIDE)	dna	10	na	24	6820
VINYL CHLORIDE RESIN (SARA,CERCLA)	9005-09-8	<15	1	dna (VC** @ <0.1 PPM, VA** @ <0.5%)	5	10	na	dna	dna
POLYVINYL CHLORIDE RESIN	28476-83-7	<15	dna	dna (VC** @ <0.1 PPM)	dna	5	na	0.5	dna
VINYL CHLORIDE RESIN (SARA,CERCLA)	9003-22-9	<10	1	dna (VC** @ <1 PPM & VA** @ <0.5%)	5	dna	na	dna	dna
VM & P NAPHTHA	64742-48-9	7.46	500	dna (BENZENE** @ 0-900 PPM)	300	1350	5.2	5	3400
* CHROMIUM OXIDE	1308-38-9	<10	dna	0.5 (AS CR)	dna	0.5	na	dna	dna
METHYL ETHYL KETONE (SARA,CERCLA)	78-93-3	5.66	200	590 (STEL 300 PPM)	200	590	70	2.7	2000
* IRON OXIDE	1309-37-1	<10	dna	5 (AS FE FUME)	dna	5	na	dna	dna
MICA	12001-26-2	<10	dna	3 (CONTAINS >0.1% CRYSTALLINE SILICA**)	dna	3	na	na	dna
ACRYLIC RESIN (SARA)	dna	<5	dna	dna (RESIDUAL MONOMER @ 0.5%)	dna	dna	na	5	dna
* CARBON BLACK	1333-86-4	<5	dna	3.5	dna	3.5	na	dna	dna

Cancer or Suspected Cancer Agent: NO
Ref. RTEC, ACGIH, Fed OSHA
** CALIF. TITLE 26: 22-12000 (PROP 65)
Contains toxic chemical subject to reporting requirements of SARA and CERCLA (40CFR 302,355,372)

* Pigment content is dependent on color.

SECTION III -- PHYSICAL DATA

BOILING RANGE: 175-282 Deg. F
VOLATILE VOLUME % : 79
WT PER GAL: 8.0-8.9 LBS
APPEARANCE: Liquid
SOLUBILITY IN WATER: na

VAPOR DENSITY: Heavier than air
EVAPORATION RATE: Butyl acetate = 1
LOW: 0.70 HIGH: 4.60
ODOR: SOLVENT

SECTION IV -- FIRE AND EXPLOSION DATA

FLAMMABILITY: OSHA: Flammable - IB
DOT: Flammable
FLASH POINT: 21 F (SETA)
LEL: 0.90
LFS: 78-93-3
UEL: 11.40
EXTINGUISHING MEDIA: Foam, CO2, dry chemical.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Wear self-contained breathing apparatus. Closed containers may explode when exposed to extreme heat. Isolate from heat, electrical equipment, sparks and open flame. Keep upwind. Vapors may spread long distances, cause flash fire or ignite explosively.

(C)=Ceiling; (S)=Skin; LD50=Oral,rat; LC50=Inhalation,rat; LFS=Lowest Flashing Solvent
dna=data not available; na=not applicable; bw=pp

-continued on page 2-

PRODUCT NO: 33 MATERIAL SAFETY DATA SHEET Page: 2

SECTION V -- HEALTH HAZARD DATA

MSDS # 10289

ENTRY ROUTES: Inhalation and skin contact.

MEDICAL CONDITIONS AGGRAVATED: Respiratory. Kidney and liver disorders. Skin. Heart.

EXPOSURE EFFECTS: Vapor, spray mist and/or dust can be harmful. Irritating to skin, mucous membranes, eyes and respiratory system. Excessive inhalation can cause headache, nausea, dizziness or asphyxiation. Repeated and prolonged occupational overexposure to solvents is associated with permanent brain and nervous system damage. Can be harmful or fatal if swallowed. Can be harmful if inhaled or absorbed through the skin. Overexposure can damage central nervous system. Overexposure or ingestion can cause lung, kidney and/or liver damage. Overexposure can cause skin and eye burns and/or injury. Skin and respiratory sensitization and allergic reaction can occur. Overexposure can cause delayed lung injury.

EMERGENCY AND FIRST AID PROCEDURES: Overexposure to vapor, spray mist or dust - provide fresh air; if breathing labored, give oxygen or artificial respiration. For skin contact, wash thoroughly with soap and water. For eyes, flush immediately with plenty of water for at least 15 minutes and get medical attention. If swallowed, drink 1 or 2 glasses of water to dilute. Do not induce vomiting. Consult physician or poison control center IMMEDIATELY. Treat symptomatically.

SECTION VI -- REACTIVITY DATA

STABILITY: Stable CONDITIONS TO AVOID: Heat, open flame, arc or sparks.

INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizers, acids, alkalies.

HAZARDOUS DECOMPOSITION PRODUCT BY FIRE, BURNING OR WELDING: CO and CO_2. Hydrogen chloride fumes. Iron oxide fumes. Acrylic monomer fumes. Vinyl chloride fumes.

HAZARDOUS POLYMERIZATION: Will not occur

SECTION VII -- SPILL OR LEAK PROCEDURES

SPILLS, LEAKS: Avoid breathing of vapors or dust. Use absorbent cleanup materials or sweep up. Place in separate container. Keep out of public sewers and waterways. If entry is threatened or occurs, notify local authorities. Eliminate all sources of ignition.

WASTE DISPOSAL: In separate, closed metal container in accordance with all applicable regulations.

EPA WASTE NO: D001 U161 U220 U239 U159

SECTION VIII -- SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION : NIOSH/MSHA certified respirator. For specific conditions refer to NIOSH Pocket Guide to Chemical Hazards, DHEW NO 78-210. Use air-line respirators in confined or restricted ventilation areas, or with polyurethane or isocyanates. Refer to 29 CFR, OSHA parts 1910, 1915, and 1916 for coating operations.

VENTILATION: Sufficient ventilation, in volume and pattern, should be provided to keep air contaminant concentrations below TLV limit. Remove welding or flame cutting decomposition products. Refer to 29 CFR, OSHA parts 1910, 1915, and 1916 for coating operations.

PROTECTIVE GLOVES: Neoprene or other suitable materials.

EYE PROTECTION: Splash-proof goggles or face shield.

OTHER PROTECTIVE EQUIPMENT FOR APPLICATION OR CLEANUP: Full protective clothing. Spark-proof equipment.

HYGIENIC PRACTICES: Wash thoroughly before eating, smoking or using washroom. Launder contaminated clothing before reuse.

SECTION IX -- SPECIAL PRECAUTIONS

HANDLING AND STORING: Keep container closed, upright when not in use. Store in cool, dry, well-ventilated area. Avoid storage temperatures above 100 degrees Fahrenheit.

OTHER PRECAUTIONS: Do not take internally. Avoid prolonged breathing of dust, vapors or spray mist or contact with skin and eyes. Do not weld or flame cut an empty container. Ground containers when pouring.

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved OMB No. 44-R1337

MATERIAL SAFETY DATA SHEET PSA2-43

MSDS # 12839

SECTION I

MANUFACTURER'S NAME: Johns-Manville Corp. & Subsidiaries
EMERGENCY TELEPHONE NO.: 303-770-1000 (X-2252)
ADDRESS (Number, Street, City, State, and ZIP Code): Greenwood Plaza, Denver, Colorado 80217
CHEMICAL NAME AND SYNONYMS: Chrysotile Asbestos
TRADE NAME AND SYNONYMS: ASBESTOS
CHEMICAL FAMILY: Asbestos
FORMULA:

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS		N/A	BASE METAL		N/A
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Chrysotile Asbestos Fiber	Approx. 100	*
*For TLV - See attached Federal Register - 6/7/72		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	N/A	SPECIFIC GRAVITY (H_2O = 1)	N/A
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR = 1)		EVAPORATION RATE (= 1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	White fibrous dry material - No odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA	Non-flammable		
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

 (Continued on reverse side) Form OSHA-20

PS0243

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
See Section II and attached Federal Register - 6/7/72

EFFECTS OF OVEREXPOSURE
Long term exposure to high concentrations of asbestos fiber may cause pulmonary disease. MSDS # 12839

EMERGENCY AND FIRST AID PROCEDURES
Avoid breathing excessive dust when handling, dumping and mixing. See caution label on bag.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Vacuum clean spillage. Repair broken bags. If sweeping is necessary, wet down spillage. Use approved respiratory equipment when required.

WASTE DISPOSAL METHOD
Place waste in closed containers. Dispose of waste in closed containers. Avoid breathing excessive dust.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
U.S. Bureau of Mines approved respirator - See OSHA 1910.93, Asbestos Fed. Register -6/11

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General) Control with mechanical dust collection equipment as much as practicable	OTHER

PROTECTIVE GLOVES

EYE PROTECTION

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Maintain good housekeeping practices. Vacuum clean waste and place in closed containers.

OTHER PRECAUTIONS
SEE CAUTION LABEL ON BAG.

PAGE (2) While the information and recommendations set forth herein are believed to be accurate as of the date hereof, JOHNS-MANVILLE CORPORATION MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM [illegible]

Form OSHA-20
Rev. April 72

MSDS # 1540

MATERIAL SAFETY DATA SHEET

NFCA 1-72

FOR COATINGS, RESINS AND RELATED MATERIALS

HMIS RATES
H = 0
F = 0
R = 0

DATE OF PREP: October 10, 1985

Section I

MANUFACTURER'S NAME: The Gibson-Homans Company

STREET ADDRESS: 1755 Enterprise Parkway CITY, STATE, AND ZIP CODE: Twinsburg, Ohio, 44087

EMERGENCY TELEPHONE NO: 216/425-7755

PRODUCT CLASS: ASPHALT EMULSION COATING MANUFACTURER'S CODE IDENTIFICATION: See Below

TRADE NAME: This Material Safety Data Sheet is applicable to the following products.
6136, 6190, 6191, 6195, 6197, 6213, 6414, 6415, 6454, 6455, 6460, 6529, 6643

Section II — HAZARDOUS INGREDIENTS

INGREDIENT	ITEC/ACGIH/OSHA CASC.	PERCENT	TLV PPM	TLV MG/M³	LEL	VAPOR PRESSURE
N/A						

N/A = Not Available

Section III — PHYSICAL DATA

BOILING RANGE: 200 - 215° F. VAPOR DENSITY: [ ] HEAVIER [X] LIGHTER THAN AIR

EVAPORATION RATE: [ ] FASTER [X] SLOWER THAN ETHER PERCENT VOLATILE BY VOLUME: >20 WEIGHT PER GALLON: 8.5 - 12.5#

Section IV — FIRE AND EXPLOSION HAZARD DATA

DOT CATEGORY: Not Regulated. FLASH POINT: N/A - Water Based LEL: Unknown

EXTINGUISHING MEDIA

N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS

N/A

SPECIAL FIRE FIGHTING PROCEDURES

N/A

MSDS #15402

Section V — HEALTH HAZARD DATA

N/A

EFFECTS OF OVEREXPOSURE

Skin - Prolonged or repeated contact may cause slight irritation to sensitive skin.

Eyes - Contact may cause slight irritation.

EMERGENCY AND FIRST AID PROCEDURES

Skin - Wash with soap and water.

Eyes - Flush with large amounts of water.

Ingestion - Contact physician.

Section VI — REACTIVITY DATA

STABILITY [ ] UNSTABLE [X] STABLE CONDITIONS TO AVOID N/A

INCOMPATIBILITY N/A

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon dioxide/carbon monoxide.

HAZARDOUS POLYMERIZATION [ ] MAY OCCUR [X] WILL NOT OCCUR

CONDITIONS TO AVOID N/A

Section VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Return to container.

WASTE DISPOSAL METHOD

Dispose of according to Federal State and local regulations.

Section VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION

N/A

VENTILATION

N/A

PROTECTIVE GLOVES Not normally needed.

EYE PROTECTION N/A

OTHER PROTECTIVE EQUIPMENT N/A

Section IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

N/A

OTHER PRECAUTIONS

KEEP OUT OF REACH OF CHILDREN.

Monsanto MATERIAL SAFETY DATA

MONSANTO PRODUCT NAME
BUTVAR® AQUEOUS DISPERSION BR

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO 63167
EMERGENCY PHONE NO.
(CALL COLLECT)
314-694-1000

PRODUCT IDENTIFICATION

MSDS # 10518

Synonyms: Aqueous dispersion of polyvinyl butyral
Chemical Name: A terpolymer of polyvinyl butyral/polyvinyl alcohol/polyvinyl acetate with added soaps
Components: Polyvinyl butyral - polymer, CAS No. 27360-07-2
Water, CAS No. 7732-18-5
Butyl ricinoleate - soap, CAS No. 151-13-3
Potassium oleate - soap, CAS No. 143-18-0
DOT Proper Shipping Name: Not Applicable
DOT Hazard Class/I.D. No.: Not Applicable
DOT Label: Not Applicable
U.S. Surface Freight Classification: Plastics, synthetic, N.O.I., liquid
Reportable Quantity (RQ) Under
DOT (49 CFR) and CERCLA Regulations: Not Applicable

SARA Hazard Notification

Hazard Categories under criteria of
SARA Title III rules (40 CFR Part 370): Not Applicable

Section 313 Hazardous Chemical(s): Not Applicable

Hazardous Chemical(s) under OSHA Hazard Communication Standard: Not Applicable

PRECAUTIONARY MEASURES AND FIRST AID

HANDLE IN ACCORDANCE WITH GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES. THESE PRACTICES INCLUDE AVOIDING UNNECESSARY EXPOSURE AND REMOVAL OF THE MATERIAL FROM EYES, SKIN AND CLOTHING.

OCCUPATIONAL CONTROL PROCEDURES

Eye Protection: BUTVAR® aqueous dispersion BR causes only slight eye irritation. No special protection is required. Use good industrial practice to avoid eye contact.

Skin Protection: Although BUTVAR aqueous dispersion BR does not present a significant skin concern, skin contamination should be minimized as good industrial practice. Wearing of protective gloves is recommended. Wash hands and contaminated skin after handling.

OCCUPATIONAL CONTROL PROCEDURES (continued)

MSDS # 10518

Respiratory Protection: Avoid breathing vapor and/or mist. Use NIOSH/MSHA approved respiratory protection equipment when airborne exposure limits (see below) are exceeded. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer. Respiratory protection programs must comply with 29 CFR 1910.134.

Ventilation: Provide natural or mechanical ventilation to minimize exposure. If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Airborne Exposure Limits:

Product: BUTVAR aqueous dispersion BR

OSHA PEL: None established
ACGIH TLV: None established

FIRE PROTECTION INFORMATION

Aqueous solution will not flash.

Flash Point: Resin >700°F

Extinguishing Media: Water spray, foam, carbon dioxide dry chemical or any Class B extinguishing agent. Use water spray to cool containers.

Special Firefighting Procedures: Firefighters and others who may be exposed to products of combustion (see "Hazardous Decomposition Products", below) should wear full protective clothing including self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

Unusual Fire and Explosion Hazards: None known.

REACTIVITY DATA

Materials to Avoid: None

Hazardous Decomposition Products: The dry solid at 100°C exposure for several hours may result in release of butyraldehyde, butyric acid, acrolein, crotonaldehyde and carbon monoxide in absence of oxygen.

Hazardous Polymerization: Does not occur.

HEALTH EFFECTS SUMMARY

The following information presents both human experience and the results of scientific experiments used by qualified experts to assess the effects of BUTVAR aqueous dispersion BR on the health of exposed individuals and to support the Precautionary Measures and Occupational Control Procedures recommended in this document. Proper evaluation of these health-related data may require the assistance of individuals trained in interpretation of this type of information.

MONSANTO MATERIAL SAFETY DATA
BUTVAR® AQUEOUS DISPERSION BR

HEALTH EFFECTS SUMMARY (continued)

MSDS # 10515

Effects of Exposure

Dermal contact and inhalation are expected to be the primary routes of occupational exposure to BUTVAR aqueous dispersion BR. Occupational exposure to this material has not been reported to cause any significant adverse human health effects. On the basis of available information, exposure to BUTVAR aqueous dispersion BR is not expected to cause significant adverse human health effects when recommended safety precautions are followed.

Toxicological Data
Data from Monsanto studies indicate the following:

Oral LD50 (Rat): >15,800 mg/kg, Practically Nontoxic
Dermal LD50 (Rabbit): >7,940 mg/kg, Practically Nontoxic
Eye Irritation (Rabbit): (FHSA) 3.3 on a scale of 110.0, Slightly Irritating
Skin Irritation (Rabbit): (FHSA) 3.0 on a scale of 8.0, Slightly Irritating

Patch testing of 50 human volunteers with BUTVAR aqueous dispersion BR produced no positive reactions following the initial application, any of the 15 serial applications, or on subsequent challenge 2 weeks later. BUTVAR aqueous dispersion BR is not considered a primary irritant, cumulative irritant or a sensitizing agent.

Components
Data from studies conducted by Monsanto are available on BUTVAR B-72 polyvinyl butyral resin, a component of this material:

Oral LD50 (Rat): >10,000 mg/kg, Practically Nontoxic
Dermal LD50 (Rabbit): >7,940 mg/kg, Practically Nontoxic
Eye Irritation (Rabbit): (FHSA) 2.8 on a scale of 110.0, Slightly Irritating
Skin Irritation (Rabbit): (FHSA) 0.0 on a scale of 8.0, Nonirritating

No mutagenic effects were observed when BUTVAR B-72 polyvinyl butyral resin was evaluated in microbial mutagenicity assays using five Salmonella strains and one yeast strain with and without mammalian microsomal activation.

PHYSICAL DATA

Appearance: Aqueous white suspension
Odor: Mild
Solubility in Water: Miscible
Density: 8.4 lbs/gL
Viscosity @ 25°C: 500 - 1,500 cps
Percent Solids: 50 - 52%
pH: 8.0 - 10.5

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

MONSANTO MATERIAL SAFETY DATA
BUTVAR® AQUEOUS DISPERSION BR

SPILL, LEAK & DISPOSAL INFORMATION

MSDS # 10518

Waste Disposal: BUTVAR aqueous dispersion BR is not a "hazardous waste" as that term is defined in 40 CFR 261, "Identification and Listing of Hazardous Waste". Burn in an approved incinerator or dispose of in an approved chemical landfill in accordance with all applicable local, state, and federal laws and regulations. Consult your attorney or appropriate regulatory officials for information on such disposal.

Spill or Leakage Procedures: In case of spill sweep up polymer and dispose of as recommended above.

ADDITIONAL COMMENTS

DO NOT FREEZE - SUSPENSION MAY BREAK.

ENVIRONMENTAL EFFECTS

Environmental Toxicity Information:

96-hr LC50 Bluegill Sunfish: 160 mg/l, Practically Nontoxic
48-hr LC50 Daphnia magna: 650 mg/l, Practically Nontoxic

DATE: 5/12/90 SUPERSEDES: 5/20/89

MSDS NUMBER S00010673

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

Manager, Product Safety
Resins Division
Monsanto Chemical Company
A unit of Monsanto Company
314-694-1000

Monsanto

DATA SHEET

No. 6019-B

BUTVAR® DISPERSION BR RESIN

MSDS # 12763

Introduction

Butvar® dispersion BR resim is a stable dispersion of plasticized polyvinyl butyral in water. Plasticizer level is at 40 parts per 100 parts of resin.

Films cast from Butvar dispersion BR resin are noted for their toughness and light transparency. Moreover, the films are unusual because they develop full strength properties when cast and dried at room temperature.

Films are strong, tough and adhere well to a range of surfaces: resistance to water, heat and sunlight is excellent. This outstanding combination of properties is used to excellent advantage in such applications as textile finishing, greaseproof and washable wallpaper coatings, aqueous-baked baking primers and decorative and protective coatings for metal, wood, glass and other materials.

Dispersion Characteristics

	Butvar® Dispersion BR Resin
Form	An aqueous dispersion of plasticized polyvinyl butyral, milk-white in color
Total Solids	50.0 to 51.0%
Viscosity	500-1500 cps. (Brookfield, No. 3 Spindle, 30 R.P.M., 25°C.)
pH	8.0-10.5
Particle Size	Most particles close to 0.5 microns: None is larger than 1.0 microns
Particle Charge	Anionic
Plasticizer Content	40 parts per 100 parts of resin (28.6% of solids)
Pounds per Gallon at 25°C.	8.4

Handling and Methods of Application

Butvar dispersion BR resin may be handled in most of the processing systems common to latex work. It can be applied by roller coating, knife coating or air knife coating: it can be sprayed in solids concentrations ranging from 30 to 40 per cent: it can be dipped with or without the use of a coagulant.

Whatever method of application is employed, care should be taken to prevent skinning of the BR dispersion during exposure to air. Closed containers are advisable whenever possible. Spray nozzles should be kept moist.

MSDS # 12763

Butvar dispersion BR resin is stable when maintained at an alkaline pH. Therefore, in formulating either product, caution should be exercised in the addition of materials which would lower the pH below 8.

Compounding Pigments and Colors

It is necessary to avoid pigments with a positive charge such as natural iron oxide, but most other pigments are satisfactory. Pigments such as whiting have been used with success, but it is advisable to avoid impurities such as lime which might form soaps and cause inversion. Colors used are the usual rubber pigments with the above limitations. One possible method of adding pigments is to add them slowly to water containing a dispersing agent, and then either run the solution through a colloid mill or run it in a ball mill for at least 24 hours.

Plasticization

If additional plasticizer is necessary for a particular formulation, the following plasticizers are recommended:

Butyl ricinoleate	Baker Castor Oil Co.
Paraplex* RG-8	Rohm & Haas Co.
Dibutyl sebacate	Rohm & Haas Co.
Flexol** TOF	Union Carbide Chemical Co.
Flexol 3GH	Union Carbide Chemical Co.
Tricresyl Phosphate	Monsanto Co.
Castor Oil	Baker Castor Oil Co.

Plasticizers should be dispersed in water before being added to the Butvar dispersion resin. The following procedure is recommended:

	Parts by Weight
Plasticizer (e.g. butyl ricinoleate)	50
Oleic Acid	2.8

Mix ingredients thoroughly — disperse in 48 parts of water containing 0.4 parts of sodium hydroxide. Good agitation is required. The finished plasticizer dispersion should be oil-in-water type and should be homogenized before addition to the Butvar dispersion resin. The plasticized dispersion should then be allowed to stand overnight before use to insure uniform penetration of the plasticizer into the polyvinyl butyral particles.

Protective Colloids

Protective colloids for increasing viscosity or decreasing pressure sensitivity are frequently added in coating operation. Suggested thickening agents are casein, hydroxyethyl cellulose, carboxymethyl cellulose and gum karaya.

*Trademark of Rohm & Haas Company
**Trademark of Union Carbide Chemicals Company

MSDS # 12763

Dispersing Agents

Suitable agents for use in dispersing pigments can be standard types accepted in the trade such as Darvan*** (R. T. Vanderbilt). Tamol* NNO (Rohm & Haas). and Horn Kem (Horn Kem Corp.).

Coagulants

The best method for coagulating the dispersion is the addition of acids to bring the pH below 3.

Extenders

Butvar dispersion BR resin may be extended with Geiva* Emulsion S-55 resins providing the polyvinyl acetate emulsion is first adjusted to a pH of 9 by the addition of ammonia.

SUGGESTED USES

Textiles

Butvar dispersion BR resin is widely used in the textile industry to impart increased abrasion resistance. durability. strength. slippage control. and reduced color crocking. One of the most successful applications has been in the finishing of nylon webbing for parachute harnesses and seat belts in order to obtain improved abrasion resistance.

Butvar dispersion BR resin has been applied to textiles from a dilute bath by impregnation on a padder. from a thickened dispersion by coating on regular spreading equipment. or by spraying. Plasticized polyvinyl butyral dispersed in water when properly processed and applied has been used to give a soft. full-bodied finish to rayon. cotton. or nylon. for a durable. non-ravelling finish for filament yarns. and for finishing curtain and drapery fabrics. glass fabrics. upholstery goods. webbing. awnings. canvas. or duck. Formulations using polyvinyl butyral have been used as transparent rug backing and as a laminating and combining agent for joining fabric to fabric or fabric to other materials.

Paper

Butvar dispersion BR resins have been used in applicators to produce greaseproof. washable coatings for wallpaper. window shades and packaging materials. It has been used also in applications applied to twisted paper yarns used for rugs and seat covers: in this application. if properly applied the dispersions increase abrasion resistance and durability of the finished product.

[redacted]

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MSDS #18764 CAUL:

CAULK

MATERIAL SAFETY DATA SHEET

MANUFACTURER'S NAME
DUTCH BOY
P.O. Box 6709
Cleveland, Ohio 44101

EMERGENCY TELEPHONE NO.
(216) 566-1917

DATE OF PREPARATION
1-Jun-88

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NAME
Latex Caulks

* = Trade Mark

PRODUCT NUMBERS AND COLORS
Acrylic Latex Caulk
C-530 White

Siliconized Acrylic Latex Caulk
C-550 White C-557 Brown

Tub & Tile Caulk
C-560 White

PRODUCT CLASS
Latex Caulk

Section II -- HAZARDOUS INGREDIENTS

[illegible]	Mineral Spirits (in C-530 only)	G	100	300	PPM	[illegible]
[illegible]	Ethylene Glycol	G	50		PPM	[illegible]
[illegible]	Titanium Dioxide	G	See Breakdown			as Dust

pH = 7.7

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether
VAPOR DENSITY -- Heavier than Air
BOILING RANGE 212-395 F
VOLATILE VOLUME 37-41 %
WT/GAL 12.0-13.4 lb.

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION
Not applicable
FLASH POINT >150 F PMCC
LEL N.A.

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

continued on page 2

CAULK Latex Caulks page 2

Section V -- HEALTH HAZARD DATA

ROUTES OF EXPOSURE
[illegible]

ACUTE Health Hazards
EFFECTS OF OVEREXPOSURE
[illegible]

SIGNS AND SYMPTOMS OF OVEREXPOSURE
[illegible]

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.

EMERGENCY AND FIRST AID PROCEDURES
[illegible]

CHRONIC Health Hazards
[illegible]

Section VI -- REACTIVITY DATA

STABILITY -- Stable
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION -- Will not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
[illegible]

WASTE DISPOSAL METHOD
[illegible]

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE
[illegible]

continued on page 3

CAULK Latex Caulks page 3

VENTILATION
[illegible]

RESPIRATORY PROTECTION
[illegible]

PROTECTIVE GLOVES
[illegible]

EYE PROTECTION
[illegible]

Section IX -- PRECAUTIONS

DOL STORAGE CATEGORY -- IB
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
[illegible]

HEALTH	2
FLAMMABILITY	0
REACTIVITY	0

[illegible]

25

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MATERIAL SAFETY DATA SHEET MSDS #15584

PRODUCT NAME Clear Urethane Seal Coat (Aerosol) #2049	# MSDS002049
MANUFACTURED BY: CRC CHEMICALS	Phone (215) 674-1300
885 LOUIS DRIVE, WARMINSTER, PA. 18974	

1. INGREDIENTS	CAS #	ACGIH TLV	OSHA PEL	Other Limits	%
*ASTM Type I Polyurethane	NA	NA	NA		13.7
Xylene	1330-20-7	100	100		13.7
Mineral Spirits	8030-30-6	NA	NA	200	13.6
Methylene Chloride	75-09-2	100	500		22.2
1,1,1 Trichloroethane	71-55-6	350	350		8.5
Propane	74-98-6	NA	1000		14
Isobutane	75-28-5	NA	NA	800	14

*Note - resin contains no free isocyanate. Propane and isobutane function as propellents only. Pressure is 55 psig at 70°F.

2. PHYSICAL DATA (Without propellent)

Specific Gravity 1.03	Vapor Pressure NA	% Volatile 85	
Boiling Point NA	Evaporation Rate Fast		
Freezing Point NA	Vapor Density Vapors are heavier than air		

Appearance and Odor Clear viscous liquid, solvent odor

Solubility Negligible in water

3. FIRE AND EXPLOSION DATA

Flashpoint < 20°F Method TCC	Flammable Limits NA	
Extinguishing Media Foam, Dry chemical, CO_2	LEL	UEL

Unusual Hazards Aerosol containers may explode when heated above 130°F

(Low flashpoint due to hydrocarbon propellent)

4. REACTIVITY AND STABILITY

Stability Stable

Hazardous decomposition products Thermal (Hydrogen chloride, carbon monoxide, chlorine and possibly phosgene)

Materials to avoid Strong oxidizers

5. PROTECTION INFORMATION

Ventilation Maintain below TLV - Use mechanical means if necessary.

Respiratory Self contained breathing apparatus if vapor conc. exceeds TLV.

Gloves Solvent resistant	Eye & Face Safety goggles

Other Protective Equipment Not normally needed for aerosol products.

MSDS #15584

6. HEALTH HAZARD DATA

Primary Routes of Entry Inhalation and skin

Signs and Symptoms of Exposure

1. Acute Overexposure Inhalation - Headache, nausea, anesthetic effects and unconsciousness. Skin - drying and defatting action. Eyes - burning and irritation.

2. Chronic Overexposure Dermititus - May have liver and kidney effects

Medical Conditions Generally Aggravated by Exposure Breathing problems

Chemicals Listed as Carcinogen or Potential Carcinogen	National Toxicology Program	Yes ☐ No ☒	IARC Monographs	Yes ☐ No ☒	OSHA	Yes ☐ No ☒

Emergency and First Aid Procedures (If symptoms persist, call a physician)

1. Inhalation Remove to fresh air. Apply artificial respiration if necessary.

2. Eyes Flush with water for 15 minutes. Do not rub.

3. Skin Wash with soap and water.

4. Ingestion Do not induce vomiting - call a physician.

7. SPILL OR LEAK PROCEDURES

Precautions to be taken in Handling and Storing Store in a cool dry area.

Steps to be taken in case Material is released or spilled Not normally an aerosol problem - Ventilate area, remove sources of ignition and absorb on inert material. Place in a closed container.

Waste Disposal Discarded filled or partially filled aerosols are hazardous waste and must be disposed of in conformance to regulations

8. SPECIAL PRECAUTIONS AND USE DIRECTIONS

Aerosol containers may explode when heated above 130°F.

The solvent vapors are heavier than air and will collect in low confined areas. Make sure ventilation is adequate for location being used.

PREPARED BY: A. B. Reed

ORIGINAL DATE OR DATE OF REVISION Nov. 1985

MATERIAL SAFETY DATA SHEET

Dynacco, Inc.

Hanford's MSDS No.: 18384
KLEAR KOTE

MANUFACTURER INFORMATION

Product Trade Name: KLEAR KOTE
MSDS Date: 11/86

Dynacco, Inc.
22021 W. Bostian Rd.
Woodinville, WA 98072
(206) 485-0554

Preparation/Revision Date: 11/86

"Most Current 7/30/90" Handwritten on MSDS

EMERGENCY Phone: (206) 485-0554

SECTION I - MATERIAL IDENTIFICATION

Chemical Name: Pre-Catalyzed, Moisture Cure Urethane

Chemical Family: Urethane Prepolymer

OTHER DESIGNATIONS (Synonyms) --------
KLEAR KOTE

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Ingredient Name	*CAS Number*	*Percent*	*Exposure Limits*
XYLENE	*1330-20-7*	*44*	*PEL: 100 ppm* *TLV: 150 ppm (STEL)*
Other Exposure: 100 ppm (TWA)			
ETHYL BENZENE	*100-41-4*	*11*	*PEL: 100 ppm* *TLV: 125 ppm (STEL)*
Other Exposure: 100 ppm (TWA)			
METHOXYL PROPANEOL	*108-65-6*	*3*	*PEL: Not established*

MATERIAL SAFETY DATA SHEET

Dynacco, Inc. *Hanford's MSDS No.: 18384*
KLEAR KOTE

--- *SECTION II - INGREDIENTS AND EXPOSURE LIMITS continued from page 1* ---

ACETATE (E.G. ARCOSOLV PM ACETATE)			*TLV: Not established*
ISOPHORONE DIISOCYANATE	*4098-71-9*	*-5 (sic)*	*PEL: Not established* *TLV: Not established*

Other Exposure: .01 ppm (Skin notation)

Synonym: IDPI

PREPOLYMER RESIN	*37*	*PEL: Not established* *TLV: Not established*

Comments: Specific chemical identity is trade secret.

SECTION III - PHYSICAL DATA

Boiling Point: 275 - 302°F
Vapor Density: Heavier than air (Air = 1)
Specific Gravity: .96 (H_2O=1)
Evaporation Rate: Slower than ether
Percent Volatile: 64 (% by volume)

SECTION IV - FIRE AND EXPLOSION DATA

Flammable Limits:

Flash Point (Method): 79°F (Seta Closed Cup)

Extinguishing Media: Dry chemical, foam, carbon dioxide. Water may be ineffective.

Special Fire Fighting Procedures: Fight as volatile liquid fire. Closed containers may explode when exposed to extreme heat. Use water to keep fire-exposed containers cool to reduce pressure. Fire fighters should wear self-contained breathing apparatus.

Unusual Fire and Explosion Hazards: Keep containers tightly closed

MATERIAL SAFETY DATA SHEET

Dynacco, Inc. *Hanford's MSDS No.: 18384*
KLEAR KOTE

--- SECTION IV - FIRE AND EXPLOSION DATA continued from page 2 ---

when not in use. Vapors may migrate to ignition source and cause flash fire. Isolate from all sources of heat, sparks, (including electrical sparks and static discharge sparks from fabrics), electrical equipment, applicances, pilot lights, smoking materials, flames and all other sources of ignition.

Harmful Combustion Products: Usual products of combustion, carbon monoxide, carbon dioxide and possibly oxides of nitrogen.

SECTION V - REACTIVITY DATA

Stability: Stable.

Hazardous Polymerization: Will not occur.

Incompatabilities/Materials to Avoid: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Usual products of combustion, carbon monoxide, carbon dioxide and possibly oxides of nitrogen.

SECTION VI - HEALTH HAZARDS

Effects of Exposure/Overexposure:

Acute: Inhalation:
Irritation of the nose, throat and eyes, dizziness, weakness, fatigue, nausea, headache, possibly narcosis and asphyxiation. May be accompanied by coughing, choking, or labored breathing. Asthma-like breathing may be delayed reaction. Vapor, spray mist or liquid causes skin and eye discomfort by defatting action.

Chronic: Inhalation:
Isocyanates can cause lung sensitization. Allergic respiratory reaction may occur in sensitized individuals when exposure to IPDI is below the TLV. Can cause lung injury. Prolonged or repeated contact with skin can cause dermatitis and possibly skin sensitization.

MATERIAL SAFETY DATA SHEET

Dynacco, Inc. *Hanford's MSDS No.: 18384*
KLEAR KOTE

SECTION VII - FIRST AID PROCEDURES

Eyes: Flush eyes with clean water for 15 minutes. If symptoms persist, seek medical attention.

Skin: Remove saturated clothing and wash skin thoroughly preferably with tincture of green soap or soap and water. Wash clothing before reuse. If symptoms persist, seek medical attention.

Inhalation: Remove patient to fresh air. If symptoms persist, seek medical attention.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: Closed containers may explode when exposed to extreme heat. Store away from heat, sparks, and flames. Avoid prolonged skin contact. Do not breathe spray mist.

Other Precautions: Ground containers while pouring and limit free fall to a few inches to prevent static sparks. Emptied containers may retain hazardous properties. Do not cut, puncture or weld on or near the container.

Personal Protection ----------

Respirator: Follow OSHA regulation 29 CFR 1910.134 for respiratory use. Use air purifying respirator that respirator supplier has demonstrated to be effective for solvent and isocyanate vapors, when concentrations exceed the TLV up to the present or maximum level at which the respirator is effective. Where overspray is present, or if the concentration of solvents or isocyanates is not known or exceeds the level at which the air-purifying respirator if effective, a positive pressure air-supplied respirator (TC119C NIOSH/MSHA) is recomended.

Eye Protection: Goggles or side shield spectacles.

Gloves: Neoprene rubber gloves.

WORKPLACE CONTROLS ----------

Ventilation: Local Exhaust: Designed and maintained to provide volume and pattern to prevent vapor concentration to excess of TLV or LEL.

Other Workplace Controls: Eye wash station and safety showers

MATERIAL SAFETY DATA SHEET

Dynacco, Inc. *Hanford's MSDS No.: 18384*
KLEAR KOTE

- SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES cont'd from page 4 --

should be available.

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: Remove sources of ignition. Provide ventilation and/or respiratory protection. Large spills may be picked up with nonsparking tools, small spills with absorbent material. Residues may be decontaminated with water/alcohol or ammonia solutions.

Waste Management/Disposal: Place in closed containers. If necessary to decontaminate, do not close container until evolution of carbon dioxide is complete. Incinerate (first open closed containers) or use secure landfill in accordance with local, state and federal regulations.

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THATCHER COMPANY P.O. BOX 27407 SALT LAKE CITY, UTAH 84127

MATERIAL SAFETY DATA SHEET MSDS # 1228

THATCHER COMPANY
P.O. Box 27407
Salt Lake City, Utah 84127

TELEPHONE: (801) 972-4587
MSDS DATE: Feb. 19, 1988
REPLACES: July 22, 1986

SECTION I

PRODUCT NAME:	FERROUS SULFAMATE SOLUTION		
SYNONYMS:	Iron (II) Sulfamate; iron sulfamate.		
CHEMICAL NAME:	Ferrous sulfamate	CHEMICAL FAMILY:	Salt of metal and acid.
FORMULA:	$Fe(SO_3NH_2)_2$	MOLECULAR WEIGHT:	$Fe(SO_3NH_2)_2$ = 247.8

DOT INFORMATION	PROPER SHIPPING NAME:	Corrosive liquid, n.o.s.
	HAZARD CLASSIFICATION:	Corrosive material
	UN/NA NUMBER:	NA 1760

SECTION II - HAZARDOUS INGREDIENTS

HAZARDOUS MATERIAL	HEALTH HAZARDS	EXPOSURE LIMITS IN AIR
Ferrous sulfamate	Corrosive: eye, skin, oral	None known

SECTION III - HEALTH HAZARD DATA

	NTP	IARC MONOGRAPHS	OSHA 29 CFR 1910
CARCINOGENIC LISTING?	[ ] Yes [X] No	[ ] Yes [X] No	[ ] Yes [X] No

ENTRY ROUTES & EFFECTS OF OVER-EXPOSURE	Contact: Can cause irritation or burns to skin and eyes. Ingestion: Can cause burns to the gastrointestinal tract.
EMERGENCY AND FIRST AID PROCEDURES	Contact: Flush thoroughly with water. For eyes, flush for at least 15 minutes and get medical attention. Ingestion: If conscious, give several glasses of milk or water. Do NOT induce vomiting. Call a physician immediately.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: Nonflammable	FLAMMABLE LIMITS	
	Lel: N/A	Uel: N/A
EXTINGUISHING MEDIA	Any.	
SPECIAL FIRE-FIGHTING PROCEDURES:	None.	
UNUSUAL FIRE AND EXPLOSION HAZARDS	At high temperatures, ferrous sulfamate can decompose, releasing oxides of sulfur and nitrogen.	

THATCHER COMPANY/LAS VEGAS DIV
[illegible] Lake Mead Drive
Henderson, NV 89015
FAX 702-564-2818
(702) 564-7622

THATCHER COMPANY OF MONTANA
3200 Raser Drive
Missoula, Montana 59801
FAX 406-721-3479
(406) 721-3479

121 Hilltop Road
Billings, Montana 59105
(406) 259-0456

THATCHER COMPANY OF NEVADA
P.O. Box 548
Carlin, Nevada 89822
(702) 754-6335
FAX 702-754-6167

MATERIAL SAFETY DATA SHEET
(Continued)

MSDS # 1228

PRODUCT NAME: FERROUS SULFAMATE SOLUTION

SECTION V - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION	None required.
VENTILATION	Use adequate ventilation.
EYE PROTECTION	Wear safety goggles.
SKIN PROTECTION	Wear rubber gloves.
OTHER PROTECTIVE EQUIPMENT	Wear whatever protective clothing is necessary to prevent contact with the skin.

SECTION VI - SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS	Avoid using iron and steel fittings. Spills should be cleaned up promptly. Avoid contact with skin and eyes. Do not take internally.
OTHER PRECAUTIONS	Due to a low pH, is corrusive to metals as well as other materials.

SECTION VII - PHYSICAL DATA

BOILING POINT (F)	Approx 215	SPECIFIC GRAVITY	About 1.52
VAPOR PRESSURE (mm Hg)	Vapor is essen-	% VOLATILE, BY VOLUME	About 50%
VAPOR DENSITY (air = 1)	tially water.	EVAPORATION RATE	Unknown.
SOLUBILITY IN WATER	Complete.		
APPEARANCE AND ODOR:	Dark green, odorless liquid.		

SECTION VIII - REACTIVITY DATA

STABILITY:	[X] STABLE [ ] UNSTABLE
HAZARDOUS POLYMERIZATION:	[X] WILL NOT OCCUR [ ] WILL OCCUR
CONDITIONS OR MATERIALS TO AVOID	Will react with metals and alkaline materials.
HAZARDOUS DECOMPOSITION PRODUCTS	Decomposes at high temperature to release oxides of sulfur and nitrogen.

SECTION IX - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL SPILLS OR LEAKS.	Wear proper safety equipment. Dike the spill and recover the material into drums. Neutralize the residue with soda ash and scoop into drums. Flush the area thoroughly with water.
WASTE DISPOSAL METHOD.	Waste ferrous sulfamate is a characteristic EPA hazardous waste due to corrosivity (D002). Dispose of in an approved EPA Disposal Facility. Comply with all local, state and federal regulations.

IARC = International Agency for Research on Cancer: Monographs
OSHA = Occupational Safety and Health Administration
N/A = Not Applicable
NTP = National Toxicology Program: Annual Report on Carcinogens

This information is, to the best of our knowledge, accurate but may not be complete. THATCHER COMPANY furnishes this information in good faith, but without warranty, representation or guarantee of its accuracy, completeness, or reliability.

Approved by: _____ Date: _____

Approved by: _____ Date: _____

THATCHER COMPANY P.O. BOX 27407 SALT LAKE CITY, UTAH 84127
(801) 972-4587
FAX (801) 972-4606

MSDS #1228

CHEM

TECHNICAL DATA SHEET

FERROUS SULFAMATE SOLUTION

Description: Clear, dark green liquid

Specification:

Ferrous Sulfamate:	48% to 52% by weight
Density:	1.50 to 1.54 gm/mL at 25 C
pH:	1.5 maximum
Sulfate Ion:	1.0% maximum
Chloride Ion:	0.02% maximum
Ferric Ion:	0.05% maximum

Packaging: 55 gallon ACT II polypropylene drums

DOT Information:

DOT proper shipping name:	Corrosive Liquid, n.o.s
Hazard class:	Corrosive Material
UN/NA number:	UN 1760
RQ amount:	N/A
Placard:	1760

8/22/88

WARRANTY

This information is, to the best of our knowledge, accurate, but may not be complete. THATCHER COMPANY furnishes this information in good faith, but without warranty, representation or guarantee of its accuracy, completeness or suitability.

THATCHER COMPANY/LAS VEGAS DIV
7000 Lake Mead Drive
Henderson, NV 89015
FAX 702-564-2818
(702) 564-7622

THATCHER COMPANY OF MONTANA
3200 River Drive
Missoula, Montana 59801
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(406) 721-3479

121 Hilltop Road
Billings, Montana 59105
(406) 259-0456

THATCHER COMPANY OF NEVADA
P.O. Box 549
Carlin, Nevada 89822
(702) 754-6335
FAX 702-754-6167

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MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1343
METHYL ISO-BUTYL KETONE

MANUFACTURER INFORMATION

Product Trade Name: METHYL ISO-BUTYL KETONE
MSDS Date: 05/01/89

J. T. Baker
222 Red School Lane
Phillipsburg, NJ 08865
(800) JTBAKER
(800) 582-2537

EFFECTIVE: 05/01/89
ISSUED: 02/07/92

EMERGENCY Phone: (908) 859-2151 24 Hour
(800) 424-9300 CHEMTREC
(800) 424-8802 National Response Center

SECTION I - MATERIAL IDENTIFICATION

Mfg's Product ID: 9320,9212,5384,9322,4855

CAS Number: 108-10-1

Formula: CH3COCH2CH(CH3)2

NIOSH RTECS Number: SA9275000

Chemical Family: KETONES

OTHER DESIGNATIONS (Synonyms) --------
METHYL ISO-BUTYL KETONE
4-METHYL-2-PENTANONE
ISOPROPYLACETONE
HEXONE

Unidentified Numbers on MSDS: M3588 M04

Additional Information: BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 2 MODERATE
FLAMMABILITY - 3 SEVERE (FLAMMABLE)
REACTIVITY - 1 SLIGHT
CONTACT - 1 SLIGHT

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1343
METHYL ISO-BUTYL KETONE

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Ingredient Name	*CAS Number*	*Percent*	*Exposure Limits*
METHYL ISO-BUTYL KETONE	*108-10-1*	*90-100*	*PEL: 50 PPM* *TLV: 50 PPM*

PRODUCT Exposure Limits: THRESHOLD LIMIT VALUE (TLV/TWA): 205 MG/M3 (50 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 300 MG/M3 (75 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 205 MG/M3 (50 PPM)

SECTION III - PHYSICAL DATA

Appearance and Odor: COLORLESS LIQUID. PLEASANT ODOR.
Product Uses: LABORATORY REAGENT

Boiling Point: 116 C (240 F) (AT 760 MMHG)
Vapor Pressure: 15 (20 C) (mmHg)
Vapor Density: 3.5 (AIR=1)
Water Solubility: MODERATE (1-10%)
pH: NOT APPLICABLE OR NOT AVAILABLE
Odor Threshold: NOT APPLICABLE OR NOT AVAILABLE
Specific Gravity: 0.79 (H2O=1)
Melting Point: -85 C (-121 F) (AT 760 MMHG)
Evaporation Rate: 1.6 (BUTYL ACETATE = 1)
Percent Volatile: 100 (21 C) BY VOLUME
Molecular Weight: 100.16
Physical State: LIQUID
Oil/Water Coeff.: NOT APPLICABLE OR NOT AVAILABLE

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1343
METHYL ISO-BUTYL KETONE

SECTION IV - FIRE AND EXPLOSION DATA

National Fire Protection Association Hazard Codes
Hazard Ratings: 0-None --> 4-Extreme

Health: 2 Fire: 3 Reactivity: 0

Flammable Limits:

LEL(%): 1.4
UEL(%): 7.5

Autoignition: 448 C (840 F)

Flash Point (Method): 15 C (60 F) (CLOSED CUP)

Extinguishing Media: USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE.)

Special Fire Fighting Procedures: FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

Unusual Fire and Explosion Hazards: VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

Harmful Combustion Products: TOXIC GASES PRODUCED: CARBON MONOXIDE, CARBON DIOXIDE

Sensitivity to Impact: NONE IDENTIFIED.

Sensitivity to Static Discharge: NONE IDENTIFIED.

SECTION V - REACTIVITY DATA

Stability: STABLE

Hazardous Polymerization: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1343
METHYL ISO-BUTYL KETONE

--- SECTION V - REACTIVITY DATA continued from page 3 ---

Incompatabilities/Materials to Avoid: STRONG OXIDIZING AGENTS, STRONG BASES, AMINES AND AMMONIA, STRONG ACIDS

Hazardous Decomposition Products: CARBON MONOXIDE, CARBON DIOXIDE

SECTION VI - HEALTH HAZARDS

Effects of Exposure/Overexposure:
INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS, IRRITATION OF UPPER RESPIRATORY TRACT, UNCONSCIOUSNESS

SKIN CONTACT: IRRITATION, DERMATITIS

EYE CONTACT: IRRITATION

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: IRRITATION OF MUCOUS MEMBRANES, HEADACHE, NAUSEA, VOMITING, DIZZINESS, GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION

Chronic: KIDNEY DAMAGE, LIVER DAMAGE

Medical Conditions Aggravated: EYE DISORDERS, SKIN DISORDERS, RESPIRATORY SYSTEM DISEASE

Routes of Entry: INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

Target Organs: RESPIRATORY SYSTEM, EYES, SKIN, CENTRAL NERVOUS SYSTEM

Cancer Statement: CARCINOGENICITY:
NTP: NO
IARC: NO
Z LIST: NO
OSHA REG: NO

CARCINOGENICITY: NONE IDENTIFIED.

Toxicity Data: TOXICITY OF COMPONENTS
ORAL RAT LD50 FOR METHYL ISO-BUTYL KETONE ... 2080 MG/KG
INHALATION MOUSE LC50 FOR METHYL ISO-BUTYL KETONE ... 23 G/M3
INTRAPERITONEAL MOUSE LD50 FOR METHYL ISO-BUTYL KETONE ... 268 MG/KG

REPRODUCTIVE EFFECTS: NONE IDENTIFIED.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1343
METHYL ISO-BUTYL KETONE

--- SECTION VI - HEALTH HAZARDS continued from page 4 ---

SECTION VII - FIRST AID PROCEDURES

Eyes: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

Skin: IN CASE OF CONTACT, FLUSH SKIN WITH WATER.

Inhalation: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

Ingestion: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. INDUCE VOMITING.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: SAF-T-DATA (TM) STORAGE COLOR CODE: RED (FLAMMABLE)

KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

Other Precautions: SPECIAL PRECAUTIONS BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID.

Personal Protection ----------

Respirator: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

Eye Protection: SAFETY GOGGLES ARE RECOMMENDED.

Gloves: POLYVINYL ALCOHOL GLOVES ARE RECOMMENDED.

Other Protective Clothing & Equipment: SKIN PROTECTION: UNIFORM AND APRON ARE RECOMMENDED.

WORKPLACE CONTROLS ----------

Ventilation: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1343
METHYL ISO-BUTYL KETONE

- SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES cont'd from page 5 --

REQUIREMENTS.

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER. J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

Waste Management/Disposal: DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

RCRA: EPA HAZARDOUS WASTE NUMBER: U161 (TOXIC WASTE)

SARA Title III / CERCLA: ACUTE: YES
CHRONIC: YES
FLAMMABILITY: YES
PRESSURE: NO
REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS METHYL ISOBUTYL KETONE (RQ = 5000 LBS)

SARA 313 TOXIC CHEMICALS: YES CONTAINS METHYL ISOBUTYL KETONE

GENERIC CLASS: C07

UN No: D.O.T. UN: UN1245

INTERNATIONAL (I.M.O.) UN:
UN1245

AIR (I.C.A.O.) UN: UN1245

DOT Hazard Class: 3.2
DOT Shipping Name: METHYL ISOBUTYL KETONE
DOT Labels/Placards: FLAMMABLE

Other Hazard Class: INTERNATIONAL (I.M.O.): 3.2

AIR (I.C.A.O.): 3.2

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1343
METHYL ISO-BUTYL KETONE

--- SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING continued from page 6 ---

LIQUID

Other Shipping Name: INTERNATIONAL (I.M.O.): METHYL ISOBUTYL KETONE

AIR (I.C.A.O.): METHYL ISOBUTYL KETONE
Other Labels/Placards: INTERNATIONAL (I.M.O.) LABELS: FLAMMABLE LIQUID

AIR (I.C.A.O.) LABELS: FLAMMABLE LIQUID

Special Shipping: U.S. CUSTOMS HARMONIZATION NUMBER: 29141300006

Additional Information: D.O.T. PACKAGING GROUP: II

D.O.T. REGULATORY REFERENCES: 49CFR 172.101; 173.119

INTERNATIONAL (I.M.O.) I.M.O. PAGE: 3257

INTERNATIONAL (I.M.O.) PACKAGING GROUP: II

INTERNATIONAL (I.M.O.) MARINE POLLUTANTS: NO

INTERNATIONAL (I.M.O.) REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.) PACKAGING GROUP: II

AIR (I.C.A.O.) REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 172.3== SEE SHIPPER REQUIREMENTS 49 CFR 172.3 AND EMPLOYEE TRAINING 49 CFR 173.1.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1343
METHYL ISO-BUTYL KETONE

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

LABELS: PRECAUTIONARY LABELING

BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 2 MODERATE
FLAMMABILITY - 3 SEVERE (FLAMMABLE)
REACTIVITY - 1 SLIGHT
CONTACT - 1 SLIGHT

LABORATORY PROTECTIVE EQUIPMENT: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

U.S. PRECAUTIONARY LABELING:

WARNING: FLAMMABLE. CAUSES IRRITATION. HARMFUL IF SWALLOWED OR INHALED. KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE ALCOHOL FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE. FLUSH SPILL AREA WITH WATER SPRAY.

INTERNATIONAL LABELING:

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

SAF-T-DATA (TM) STORAGE COLOR CODE: RED (FLAMMABLE)

Additional MSDS Information: COPYRIGHT 1992 J T BAKER INC.

(TM) TRADEMARKS OF J T BAKER INC.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

Regulatory Information ----------

TSCA: TSCA INVENTORY: YES

Manufacturer's Disclaimer: THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1343
METHYL ISO-BUTYL KETONE

--- SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS continued from page 8 ---

IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE. THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

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MATERIAL SAFETY DATA SHEET

Penetone Corporation
A Subsidiary Of West Chemical
Products, Inc.

Hanford's MSDS No.: 13069
KLENOBOWL

MANUFACTURER INFORMATION

Product Trade Name: KLENOBOWL
MSDS Date: 05/10/88

Penetone Corporation
A Subsidiary Of West Chemical Products, Inc.
74 Hudson Avenue
Tenafly, NJ 07670

EMERGENCY Phone: (201) 567-3000

SECTION I - MATERIAL IDENTIFICATION

Formula: Hydrochloric acid, rust inhibitor, dye, quaternary ammonium chloride, water.

Chemical Family: Acid cleaner.

OTHER DESIGNATIONS (Synonyms) --------
KLENOBOWL

Additional Information: Confidential Formula - Information not to be disclosed to other than recipient and other regulatory agencies.

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Ingredient Name	*CAS Number*	*Percent*	*Exposure Limits*
HYDROCHLORIC ACID	*7647-01-0*		*PEL: 5 ppm* *TLV: 5 ppm*

MATERIAL SAFETY DATA SHEET

Penetone Corporation
A Subsidiary Of West Chemical
Products, Inc.

Hanford's MSDS No.: 13069
KLENOBOWL

SECTION III - PHYSICAL DATA

Appearance and Odor: Milky liquid with acid odor.
Boiling Point: Approximately 212°F
Vapor Pressure: Not Determined
Vapor Density: Not Determined
Water Solubility: Complete (% by wt @ 20°C/68°F)
pH: Approximately 1, as received
Specific Gravity: 1.175 (H_2O = 1 @ 75°F)
Evaporation Rate: Approximately equal to water (Ether = 1)
Percent Volatile: Negligible (by vol. @ 70°F)

SECTION IV - FIRE AND EXPLOSION DATA

Flammable Limits:

LEL(%): Not Applicable.
UEL(%): Not Applicable.

Flash Point (Method): None (COC) (PMCC)

Extinguishing Media: Not applicable.

Special Fire Fighting Procedures: Avoid contact with spilled material. Cool container with water.

Unusual Fire and Explosion Hazards: None known.

SECTION V - REACTIVITY DATA

Stability: Stable.

Hazardous Polymerization: Will not occur.

Incompatabilities/Materials to Avoid: Do not mix with strong alkalies or oxidizing agents.

MATERIAL SAFETY DATA SHEET

Penetone Corporation
A Subsidiary Of West Chemical Products, Inc.

Hanford's MSDS No.: 13069
KLENOBOWL

--- SECTION V - REACTIVITY DATA continued from page 2 ---

Hazardous Decomposition Products: None known.

SECTION VI - HEALTH HAZARDS

Signs / Symptoms: SKIN: May cause burns upon contact or repeated exposure.

EYES: May cause burns upon contact or repeated exposure.

INHALATION: Due to obnoxious odor of hydrogen chloride overexposure is unlikely.

Effects of Exposure/Overexposure:
SKIN: May cause burns upon contact or repeated exposure.

EYES: May cause burns upon contact.

Medical Conditions Aggravated: Cuts and abrasions.

Routes of Entry: Eyes, skin.

SECTION VII - FIRST AID PROCEDURES

Eyes: Wash with water for 15 minutes. See physician immediately.

Skin: Flush immediately with water. Consult physician if irritation develops or persists.

Inhalation: Remove to fresh air.

Ingestion: Drink milk of magnesia and copious amounts of water. Seek physician immediately.

MATERIAL SAFETY DATA SHEET

Penetone Corporation
A Subsidiary Of West Chemical
Products, Inc.

Hanford's MSDS No.: 13069
KLENOBOWL

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: Avoid contact with skin, eyes and clothing.
Store away from strong alkalies and/or oxidizing agents.

Personal Protection ----------

Respirator: None needed under normal use conditions.

Eye Protection: Splash proof goggles if required.

Gloves: Rubber if required.

Other Protective Clothing & Equipment: Apron and/or rubber boots recommended.

WORKPLACE CONTROLS ----------

Ventilation: None needed under normal use conditions.

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: Provide adequate ventilation. Neutralize (e.g.-soda ash) and flush with water.

Neutralizing Chemicals: Not Applicable.

Waste Management/Disposal: Dispose of in accordance with local, state and federal EPA regulations.

DOT Shipping Name: Compound Cleaning Liquid (Containing hydrogen chloride): Corrosive Material

MATERIAL SAFETY DATA SHEET

Penetone Corporation
A Subsidiary Of West Chemical
Products, Inc.

Hanford's MSDS No.: 13069
KLENOBOWL

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

Manufacturer's Disclaimer: The information presented herein has been compiled from sources considered to be dependable and accurate to the best of Penetone's knowledge. However, Penetone Corporation makes no warranty, express or implied, regarding the acuracy of such data or the results to be obtained from the use thereof.

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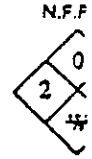
MSDS #1288



MATERIAL SAFETY DATA SHEET

VENDEE AND THIRD PERSONS ASSUME THE RISK OF INJURY PROXIMATELY CAUSED BY THE MATERIAL IF REASONABLE SAFETY PROCEDURES ARE NOT FOLLOWED AS PROVIDED FOR IN THE DATA SHEET, AND VENDOR SHALL NOT BE LIABLE FOR SUCH INJURY. FURTHERMORE, VENDOR SHALL NOT BE LIABLE FOR INJURY TO VENDEE OR THIRD PERSONS PROXIMATELY CAUSED BY ABNORMAL USE OF THE MATERIAL EVEN IF REASONABLE SAFETY PROCEDURES ARE FOLLOWED.

ALL PERSONS USING THIS PRODUCT, ALL PERSONS WORKING IN AN AREA WHERE THIS PRODUCT IS USED, AND ALL PERSONS HANDLING THIS PRODUCT SHOULD BE FAMILIAR WITH THE CONTENTS OF THIS DATA SHEET. POSTING THIS DOCUMENT FOR EMPLOYEE NOTIFICATION IS RECOMMENDED BY THE VENDOR.

I PRODUCT IDENTIFICATION

MANUFACTURER'S NAME	Seafab Metal Corp.	TELEPHONE NO.	(206)447-2718
ADDRESS	2700 16th Avenue, S.W., Seattle, Washington 98134		
TRADE NAMES	Sheet Lead		
SYNONYMS	Chemical Grade Sheet Lead		
INTENDED USE	Industrial, Commercial and Domestic		

II HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT (CAS#)	WEIGHT %	HAZARD DATA
Lead (CAS# 7439-92-1)	99.9	30 ug/m^3*
Contains trace amounts of copper equaling less than 0.1%		
(CAS# 7440-50-8)		

*Ref: Occupational Safety & Health Standards, General Industry Standards Part 1910

III PHYSICAL DATA

BOILING POINT @ 760 MM Hg	3164°F (approx.)	MELTING POINT	621°F (approx.)
SPECIFIC GRAVITY (H$_2$O = 1)	11.3 (approx.)	VAPOR PRESSURE	Not Applicable
VAPOR DENSITY (AIR = 1)	Not Applicable	SOLUBILITY IN H$_2$O (% BY WT)	Negligible
% VOLATILES BY VOL	Not Applicable	EVAPORATION RATE (BUTYL ACETATE = 1)	Not Applicable
APPEARANCE AND ODOR	Bluish-gray metal: no apparent odor		

MSDS # 1288

IV HEALTH HAZARD INFORMATION

Routes of Exposure When Processing or Handling

Inhalation	Dust, vapor and/or fume may be irritating to the respiratory system, and can result in both acute and chronic overexposure.
Skin Contact	Dust, vapor and/or fume may cause irritation.
Skin Absorption	Dust, vapor and/or fume are not readily absorbed through the skin.
Eye Contact	Dust, vapor and/or fume may cause irritation.
Ingestion	Dust, vapor and/or fume may be absorbed by the digestive system, and can result in both acute and chronic overexposure.

Effects of Overexposure

Acute Overexposure	If left untreated: weakness, vomiting, loss of appetite, uncoordinated body movements, convulsions, stupor, and possibly coma.
Chronic Overexposure	If left untreated: weakness, insomnia, hypertension, slight irritation to skin and eyes, metallic taste in mouth, anemia, constipation, headache, muscle and joint pains, neuromuscular dysfunction, possible paralysis and encephalopathy.

Emergency and First Aid Procedures

Eyes	Flush with copious quantities of water. Get immediate medical attention.
Skin	Wash thoroughly with soap and water.
Inhalation	Remove from exposure. Get medical attention if experiencing effects of overexposure.
Ingestion	Get immediate medical attention.

Notes to Physician

Lead and its inorganic compounds are neurotoxins which may produce peripheral neuropathy. For an overview of the effects of lead exposure, consult Occupational Safety and Health Administration Appendix A of Occupational Exposure to Lead (29CFR1910.1025).

MSDS #1288

V FIRE AND EXPLOSION DATA

Flash Point (Test Method)	Not Applicable	Autoignition Temperature	Not Applicable

Flammable Limits in Air (% By Vol)	Lower	Not Applicable	Upper	Not Applicable

Extinguishing Media	Dry chemical or carbon dioxide should be used on surrounding fire. Do not use water on fires where molten metal is present.
Special Fire Fighting Procedures	Use full body protective clothing and full-facepiece, self-contained breathing apparatus operated in a positive-pressure mode.
Unusual Fire and Explosion Hazard	Molten metals produce fume, vapor and/or dust that may be toxic and/or respiratory irritants. The product, or its dust, can react vigorously with strong oxidizing agents.

VI REACTIVITY DATA

Conditions Contributing To Instability	Not Applicable
Incompatibility	Strong oxidizers and this product may liberate hydrogen gas.
Hazardous Decomposition Products	High temperatures may produce heavy metal fume, vapor and/or dust.
Conditions Contributing to Hazardous Polymerization	Not Applicable

VII SPILL OR LEAK PROCEDURES

Steps To Be Taken If Material Is Released or Spilled

Dust material should be vacuumed, or wet swept where vacuuming is not feasible. Particulate matter should be stored in dry containers for later disposal. Do not use compressed air or dry sweeping as a means of cleaning.

Neutralizing Chemicals: Not Applicable

Waste Disposal Method

Dispose of toxic substances and hazardous wastes in accordance with local, state and federal regulations.

VIII SPECIAL PROTECTION INFORMATION

Ventilation Requirements

Ventilation, as described in the Industrial Ventilation Manual produced by the American Conference of Governmental Industrial Hygienists, shall be provided in areas where exposures are above the permissible exposure limits or threshold limit values specified by OSHA or other local, state and federal regulations.

SPECIFIC PERSONAL PROTECTION EQUIPMENT

Respiratory: As specified by 29CFR1910.1025 Subpart (f) of the Federal Occupational Safety and Health Administration Standard for Occupational Exposure to Lead. Other local and state regulations may also apply.

Eye: Face shield or vented goggles should be used around molten metal.

Glove: Gloves should be worn when handling the product is necessary.

Other Clothing and Equipment

Coveralls, or other full body clothing, shall be worn during product use and properly laundered after use, with the wash water disposed of in accordance with local, state and federal regulations. Hard hat, safety boots and other safety equipment should be worn as appropriate for the industrial environment. Personal clothing and shoes should be protected from contamination with this product.

IX SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS

MSDS #1288

There are two major means of heavy metal absorption; namely, inhalation and ingestion. Most inhalation problems can be prevented with adequate use of aforementioned ventilation and respirator information. Always exercise normal, good personal hygiene prior to smoking or eating. Smoking and eating should be confined to non-contaminated areas.

Work clothes and equipment should remain in designated lead contaminated areas, and never taken home or laundered with personal clothing. Launder contaminated clothing before reuse.

Wash hands, face, neck and arms thoroughly before eating or smoking.

The product is intended for industrial, commercial and domestic use, and should be isolated from children and their environment. Caution must be exercised not to expose anyone to the smoke fumes and dust generated from the use of this product.

Do not smoke while using this product.

OTHER HANDLING AND STORAGE REQUIREMENTS

Store in dry area where accidental contact with acids is not possible.

Avoid skin contact.

FOR INDUSTRIAL AND COMMERCIAL USE, OR WHERE PRODUCT IS CONTINUALLY USED:

Adhere to all personal protection equipment procedures when handling, and ventilation requirements when heavy metal exposures are above permissible exposure limits or threshold limit values.

Before Using This Product Be Familiar With The Information Contained In:

The Federal Standard for Occupational Exposure to Lead (29CFR1910.1025): Published in the Federal Register on Tuesday, November 14, 1978, by the Occupational Safety and Health Administration.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1323
MERCURY (METAL)

MANUFACTURER INFORMATION

Product Trade Name: MERCURY (METAL)
MSDS Date: 08/28/89

J. T. Baker
222 Red School Lane
Phillipsburg, NJ 08865
(800) JTBAKER
(800) 582-2537

EFFECTIVE: 08/28/89
ISSUED: 02/07/92

EMERGENCY Phone: (908) 859-2151 24 Hour
(800) 424-9300 CHEMTREC
(800) 424-8802 National Response Center

SECTION I - MATERIAL IDENTIFICATION

Mfg's Product ID: 2564,2567,2569,2572

CAS Number: 7439-97-6

Formula: HG

NIOSH RTECS Number: OV4550000

Chemical Family: METALS

OTHER DESIGNATIONS (Synonyms) --------
MERCURY (METAL)
QUICKSILVER
LIQUID SILVER

Unidentified Numbers on MSDS: M1599 M04

Additional Information: BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 4 EXTREME (POISON)
FLAMMABILITY - 0 NONE
REACTIVITY - 1 SLIGHT
CONTACT - 3 SEVERE (LIFE)

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1323
MERCURY (METAL)

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Ingredient Name	*CAS Number*	*Percent*	*Exposure Limits*
MERCURY	*7439-97-6*	*90-100*	*PEL: 0.05 MG/M3* *TLV: 0.05 MG/M3*

Comments: THE TLV AND PEL LISTED FOR MERCURY ARE FOR MERCURY VAPOR (SKIN).

PRODUCT Exposure Limits: THRESHOLD LIMIT VALUE (TLV/TWA): 0.05 MG/M3

THE TLV LISTED DENOTES TLV (SKIN).

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 0.05 MG/M3

THE PEL LISTED DENOTES PEL (SKIN).

SECTION III - PHYSICAL DATA

Appearance and Odor: SILVERY-WHITE LIQUID METAL.
Product Uses: LABORATORY REAGENT

Boiling Point: 357 C (674 F) (AT 760 MMHG)
Vapor Pressure: .001 (20 C) (mmHg)
Vapor Density: 7.0 (AIR=1)
Water Solubility: NEGLIGIBLE (<0.1%)
pH: NOT APPLICABLE OR NOT AVAILABLE
Odor Threshold: NOT APPLICABLE OR NOT AVAILABLE
Specific Gravity: 13.5 (H2O=1)
Melting Point: -39 C (-38 F) (AT 760 MMHG)
Evaporation Rate: 4 (BUTYL ACETATE = 1)
Percent Volatile: 100 (21 C) BY VOLUME
Molecular Weight: 200.59
Physical State: LIQUID
Oil/Water Coeff.: NOT APPLICABLE OR NOT AVAILABLE

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1323
MERCURY (METAL)

SECTION IV - FIRE AND EXPLOSION DATA

Flammable Limits:

LEL(%): NOT APPLICABLE OR NOT AVAILABLE
UEL(%): NOT APPLICABLE OR NOT AVAILABLE

Autoignition: NOT APPLICABLE OR NOT AVAILABLE

Flash Point (Method): NOT APPLICABLE OR NOT AVAILABLE

Extinguishing Media: USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

Special Fire Fighting Procedures: FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

Unusual Fire and Explosion Hazards: NONE IDENTIFIED.

Harmful Combustion Products: TOXIC GASES PRODUCED: MERCURY

Sensitivity to Impact: NONE IDENTIFIED.

Sensitivity to Static Discharge: NONE IDENTIFIED.

SECTION V - REACTIVITY DATA

Stability: STABLE

Hazardous Polymerization: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

Incompatabilities/Materials to Avoid: STRONG ACIDS, AZIDES, AMMONIA, ALKALI METALS, ALUMINUM, STRONG OXIDIZING AGENTS, ACETYLENE

Hazardous Decomposition Products: NONE IDENTIFIED

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1323
MERCURY (METAL)

SECTION VI - HEALTH HAZARDS

Effects of Exposure/Overexposure:
INHALATION: COUGHING, CHEST PAINS, HEADACHE, NAUSEA, VOMITING, CENTRAL NERVOUS SYSTEM DEPRESSION, GASTROINTESTINAL IRRITATION, DIARRHEA, PULMONARY EDEMA, KIDNEY DAMAGE

SKIN CONTACT: IRRITATION, DERMATITIS

EYE CONTACT: IRRITATION

SKIN ABSORPTION: MAY OCCUR

INGESTION: CORROSION OF MOUTH, THROAT, AND STOMACH, GASTROINTESTINAL PAIN, GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING

Chronic: KIDNEY DAMAGE, LIVER DAMAGE, CENTRAL NERVOUS SYSTEM DEPRESSION, HEADACHE, SHAKES, LOOSE TEETH, IMPAIRED MEMORY, LOSS OF APPETITE, SKIN ULCERATION, MERCURY BUILD-UP IN THE BRAIN, LIVER, AND KIDNEYS

Medical Conditions Aggravated: ALCOHOLISM, KIDNEY DISORDERS

Routes of Entry: INHALATION, ABSORPTION, INGESTION, EYE CONTACT, SKIN CONTACT

Target Organs: EYES, SKIN, RESPIRATORY SYSTEM, CENTRAL NERVOUS SYSTEM, KIDNEYS, LIVER

Cancer Statement: CARCINOGENICITY:
NTP: NO
IARC: NO
Z LIST: NO
OSHA REG: NO

CARCINOGENICITY: NONE IDENTIFIED.

Toxicity Data: TOXICITY OF COMPONENTS
NO INFORMATION IS AVAILABLE

REPRODUCTIVE EFFECTS: NONE IDENTIFIED.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1323
MERCURY (METAL)

SECTION VII - FIRST AID PROCEDURES

Eyes: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

Skin: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

Inhalation: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

Ingestion: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.

Additional Information: MEDICAL SURVEILLANCE: PROVIDE PREPLACEMENT AND PERIODIC MEDICAL EXAMINATIONS FOR THOSE REGULARLY EXPOSED TO MERCURY, WITH EMPHASIS ON BLOOD, CENTRAL NERVOUS SYSTEM, SKIN, LUNGS, LIVER, KIDNEYS, AND GASTROINTESTINAL TRACT.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: SAF-T-DATA (TM) STORAGE COLOR CODE: BLUE (HEALTH)

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.

Personal Protection ----------

Respirator: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

Eye Protection: SAFETY GOGGLES AND FACE SHIELD ARE RECOMMENDED.

Gloves: RUBBER GLOVES ARE RECOMMENDED.

Other Protective Clothing & Equipment: SKIN PROTECTION: UNIFORM AND PROTECTIVE SUIT ARE RECOMMENDED.

WORKPLACE CONTROLS ----------

Ventilation: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1323
MERCURY (METAL)

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. CLEAN UP SPILL IMMEDIATELY. COLLECT AND STORE USING A SUCTION PUMP WITH A CAPILLARY TUBE. CALCIUM POLYSULFIDE WITH EXCESS SULFUR SHOULD BE SPRINKLED INTO CRACKS OR INACCESSIBLE SITES. KEEP COLLECTED MERCURY IN A TIGHTLY CLOSED BOTTLE FOR RECOVERY OR DISPOSAL. J.T. BAKER CINNASORB(R) AND RESISORB(R) ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

Waste Management/Disposal: DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

RCRA: EPA HAZARDOUS WASTE NUMBER: U151 (TOXIC WASTE)

SARA Title III / CERCLA: ACUTE: YES
CHRONIC: YES
FLAMMABILITY: NO
PRESSURE: NO
REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS MERCURY (RQ = 1 LB)

SARA 313 TOXIC CHEMICALS: YES CONTAINS MERCURY

GENERIC CLASS: C15

UN No: INTERNATIONAL (I.M.O.): UN2809

NA Number: D.O.T. NA: NA2809

AIR (I.C.A.O.): UN2809

DOT Hazard Class: ORM-B
DOT Shipping Name: MERCURY, METALLIC (AIR ONLY)
DOT Labels/Placards: NONE

Other Hazard Class: INTERNATIONAL (I.M.O.): 8

AIR (I.C.A.O.): 8
Other Shipping Name: INTERNATIONAL (I.M.O.): MERCURY, METAL

AIR (I.C.A.O.): MERCURY, METAL
Other Labels/Placards:
INTERNATIONAL (I.M.O.) LABELS: CORROSIVE

MATERIAL SAFETY DATA SHEET

J. T. Baker *Hanford's MSDS No.: 1323*
MERCURY (METAL)

--- SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING continued from page 6 ---

AIR (I.C.A.O.) LABELS: CORROSIVE

Special Shipping: REPORTABLE QUANTITY: 1 LBS.

U.S. CUSTOMS HARMONIZATION NUMBER: 28054000005

Additional Information: REGULATORY REFERENCES: 49CFR 172.101; 173.500; 173.510

INTERNATIONAL (I.M.O.) I.M.O. PAGE: 8182

INTERNATIONAL (I.M.O.) MARINE POLLUTANTS: NO

INTERNATIONAL (I.M.O.) PACKAGING GROUP: III

INTERNATIONAL (I.M.O.) REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.) PACKAGING GROUP: III

AIR (I.C.A.O.) REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 172.3== SEE SHIPPER REQUIREMENTS 49 CFR 172.3 AND EMPLOYEE TRAINING 49 CFR 173.1.

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

LABELS: PRECAUTIONARY LABELING

BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 4 EXTREME (POISON)
FLAMMABILITY - 0 NONE
REACTIVITY - 1 SLIGHT
CONTACT - 3 SEVERE (LIFE)

LABORATORY PROTECTIVE EQUIPMENT: GOGGLES; LAB COAT; VENT HOOD; PROPER

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1323
MERCURY (METAL)

--- SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS continued from page 7 ---

GLOVES

U.S. PRECAUTIONARY LABELING:

POISON DANGER EXCEPTIONAL CONTACT HAZARD: READ MATERIAL SAFETY DATA SHEET. MAY BE FATAL IF SWALLOWED OR INHALED. EMITS TOXIC VAPORS, ESPECIALLY WHEN HEATED. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

INTERNATIONAL LABELING:

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

SAF-T-DATA (TM) STORAGE COLOR CODE: BLUE (HEALTH)

Additional MSDS Information: COPYRIGHT 1992 J T BAKER INC.

(TM) TRADEMARKS OF J T BAKER INC.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

Regulatory Information ----------

TSCA: TSCA INVENTORY: YES

Manufacturer's Disclaimer: THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE. THE USER

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1323
MERCURY (METAL)

SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

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MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2629
MINERAL OIL

MANUFACTURER INFORMATION

Product Trade Name: MINERAL OIL
MSDS Date: 05/01/89

J. T. Baker
222 Red School Lane
Phillipsburg, NJ 08865
(800) JTBAKER
(800) 582-2537

EFFECTIVE: 05/01/89
ISSUED: 02/07/92

EMERGENCY Phone: (908) 859-2151 24 Hour
(800) 424-9300 CHEMTREC
(800) 424-8802 National Response Center

SECTION I - MATERIAL IDENTIFICATION

Mfg's Product ID: 2705

CAS Number: 8012-95-1

Formula: NOT APPLICABLE OR NOT AVAILABLE

NIOSH RTECS Number: PY8030000

Chemical Family: OILS

OTHER DESIGNATIONS (Synonyms) --------
MINERAL OIL
PARAFFIN OIL
WHITE MINERAL OIL
NUJOL

Unidentified Numbers on MSDS: M7700 M05

Additional Information: BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 1 SLIGHT
FLAMMABILITY - 1 SLIGHT
REACTIVITY - 0 NONE
CONTACT - 1 SLIGHT

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2629
MINERAL OIL

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Ingredient Name	*CAS Number*	*Percent*	*Exposure Limits*
MINERAL OIL	*8012-95-1*	*90-100*	*PEL: 5 MG/M3* *TLV: 5 MG/M3*

PRODUCT Exposure Limits: THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3

TLV IS FOR OIL MIST, MINERAL.

SHORT-TERM EXPOSURE LIMIT (STEL): 10 MG/M3

STEL IS FOR OIL MIST, MINERAL.

PERMISSIBLE EXPOSURE LIMIT (PEL): 5 MG/M3

PEL IS FOR OIL MIST, MINERAL.

SECTION III - PHYSICAL DATA

Appearance and Odor: CLEAR, COLORLESS VISCOUS LIQUID. ODORLESS.
Product Uses: LABORATORY REAGENT

Boiling Point: NOT APPLICABLE OR NOT AVAILABLE
Vapor Pressure: <0.5 (20 C) (mmHg)
Vapor Density: NOT APPLICABLE OR NOT AVAILABLE
Water Solubility: NEGLIGIBLE (<0.1%)
pH: NOT APPLICABLE OR NOT AVAILABLE
Odor Threshold: NOT APPLICABLE OR NOT AVAILABLE
Specific Gravity: 0.85 (H2O=1)
Melting Point: -18 C (-0 F) (AT 760 MMHG)
Evaporation Rate: NOT APPLICABLE OR NOT AVAILABLE
Percent Volatile: 0 (21 C) BY VOLUME
Molecular Weight: NOT APPLICABLE OR NOT AVAILABLE
Physical State: LIQUID
Oil/Water Coeff.: NOT APPLICABLE OR NOT AVAILABLE

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2629
MINERAL OIL

SECTION IV - FIRE AND EXPLOSION DATA

National Fire Protection Association Hazard Codes
Hazard Ratings: 0-None --> 4-Extreme

Health: 0 Fire: 1 Reactivity: 0

Flammable Limits:

LEL(%): NOT APPLICABLE OR NOT AVAILABLE
UEL(%): NOT APPLICABLE OR NOT AVAILABLE

Autoignition: NOT APPLICABLE OR NOT AVAILABLE

Flash Point (Method): 215 C (420 F) (CLOSED CUP)

Extinguishing Media: USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE.)

Special Fire Fighting Procedures: FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

Unusual Fire and Explosion Hazards: NONE IDENTIFIED.

Harmful Combustion Products: TOXIC GASES PRODUCED: CARBON MONOXIDE, CARBON DIOXIDE

Sensitivity to Impact: NONE IDENTIFIED.

Sensitivity to Static Discharge: NONE IDENTIFIED.

SECTION V - REACTIVITY DATA

Stability: STABLE

Hazardous Polymerization: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME

MATERIAL SAFETY DATA SHEET

J. T. Baker *Hanford's MSDS No.: 2629*
MINERAL OIL

--- SECTION V - REACTIVITY DATA continued from page 3 ---

Incompatabilities/Materials to Avoid: STRONG OXIDIZING AGENTS, CHLORINE

Hazardous Decomposition Products: CARBON MONOXIDE, CARBON DIOXIDE

SECTION VI - HEALTH HAZARDS

Effects of Exposure/Overexposure:
INHALATION: IRRITATION OF MUCOUS MEMBRANES, HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS, IRRITATION OF UPPER RESPIRATORY TRACT, UNCONSCIOUSNESS

SKIN CONTACT: PROLONGED CONTACT MAY CAUSE IRRITATION

EYE CONTACT: IRRITATION

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NAUSEA, VOMITING, DIARRHEA

Chronic: NONE IDENTIFIED

Medical Conditions Aggravated: NONE IDENTIFIED

Routes of Entry: INHALATION, INGESTION, SKIN CONTACT, EYE CONTACT

Target Organs: RESPIRATORY SYSTEM, LUNGS, SKIN

Cancer Statement: CARCINOGENICITY:
NTP: NO
IARC: NO
Z LIST: NO
OSHA REG: NO

CARCINOGENICITY: NONE IDENTIFIED.

Toxicity Data: TOXICITY OF COMPONENTS
NO INFORMATION IS AVAILABLE

REPRODUCTIVE EFFECTS: NONE IDENTIFIED.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 2629
MINERAL OIL

SECTION VII - FIRST AID PROCEDURES

Eyes: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

Skin: IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

Inhalation: IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR.

Ingestion: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: SAF-T-DATA (TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA. DO NOT STORE NEAR OXIDIZING MATERIALS.

Other Precautions: SPECIAL PRECAUTIONS PRODUCT MAY SOLIDIFY AT ROOM TEMPERATURE.

Personal Protection ----------

Respirator: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 250 MG/M3, A HIGH-EFFICIENCY PARTICULATE RESPIRATOR IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

Eye Protection: SAFETY GOGGLES ARE RECOMMENDED.

Gloves: PROPER GLOVES ARE RECOMMENDED.

WORKPLACE CONTROLS ----------

Ventilation: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

MATERIAL SAFETY DATA SHEET

J. T. Baker *Hanford's MSDS No.: 2629*
MINERAL OIL

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: WEAR SUITABLE PROTECTIVE CLOTHING. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

Waste Management/Disposal: DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

SARA Title III / CERCLA: ACUTE: NO
CHRONIC: NO
FLAMMABILITY: NO
PRESSURE: NO
REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: NO

SARA 313 TOXIC CHEMICALS: NO

DOT Shipping Name: CHEMICALS, N.O.S. (NON-REGULATED)

Other Shipping Name: INTERNATIONAL (I.M.O.): CHEMICALS, N.O.S. (NON-REGULATED)

AIR (I.C.A.O.): CHEMICALS, N.O.S. (NON-REGULATED)

Special Shipping: U.S. CUSTOMS HARMONIZATION NUMBER: 27100045308

Additional Information: INTERNATIONAL (I.M.O.) MARINE POLLUTANTS: NO

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

LABELS: PRECAUTIONARY LABELING

BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 1 SLIGHT
FLAMMABILITY - 1 SLIGHT
REACTIVITY - 0 NONE
CONTACT - 1 SLIGHT

LABORATORY PROTECTIVE EQUIPMENT: GOGGLES; LAB COAT

MATERIAL SAFETY DATA SHEET

J. T. Baker *Hanford's MSDS No.: 2629*
MINERAL OIL

ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
MATERIAL SAFETY DATA SHEET
24-HOUR EMERGENCY TELEPHONE — (201) 859-2151
CHEMTREC # (800) 424-9300 — NATIONAL RESPONSE CENTER # (800) 424-8802

N3660 004 NITRIC ACID PAGE: 1
EFFECTIVE: 05/01/89 ISSUED: 05/16/89

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: NITRIC ACID
COMMON SYNONYMS: HYDROGEN NITRATE; AZOTIC ACID
CHEMICAL FAMILY: INORGANIC ACIDS
FORMULA: HNO3
FORMULA WT.: 63.01
CAS NO.: 7697-37-2
NIOSH/RTECS NO.: QU5775000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 4801,9597,5113,9602,5371,9593,9605,9600,9616,6901,9606,9601

MSDS # 1384

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	3	SEVERE (OXIDIZER)
CONTACT	-	4	EXTREME (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

POISON DANGER

SPILLAGE MAY CAUSE FIRE OR LIBERATE DANGEROUS GAS. HARMFUL IF INHALED AND MAY CAUSE DELAYED LUNG INJURY. STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. LIQUID AND VAPOR CAUSE SEVERE BURNS. MAY BE FATAL IF SWALLOWED OR INHALED.
KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS. DO NOT STORE NEAR COMBUSTIBLE MATERIALS. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY. IN CASE OF SPILL, NEUTRALIZE WITH SODA ASH OR LIME.

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
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N3660 C04 NITRIC ACID PAGE: 2
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PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

MSDS # 1384

SAF-T-DATA* STORAGE COLOR CODE: YELLOW (REACTIVE)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
NITRIC ACID	7697-37-2	65-71	2 PPM	2 PPM
WATER	7732-18-5	29-35	N/E	N/E

SECTION III - PHYSICAL DATA

BOILING POINT: 121 C (249 F)
(AT 760 MM HG)

VAPOR PRESSURE (MMHG): 9
(20 C)

MELTING POINT: -42 C (-43 F)
(AT 760 MM HG)

VAPOR DENSITY (AIR=1): N/A

SPECIFIC GRAVITY: 1.41
(H2O=1)

EVAPORATION RATE: N/A

SOLUBILITY(H2O): COMPLETE (100%)

% VOLATILES BY VOLUME: 100
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. SUFFOCATING ODOR.

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
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SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A NFPA 704M RATING: 3-0-0 OXY

AUTOIGNITION TEMPERATURE: N/A

MSDS # 1384

FLAMMABLE LIMITS: UPPER - N/A LOWER - N/A

FIRE EXTINQUISHING MEDIA
USE WATER SPRAY.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE EXPOSED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL; DO NOT GET WATER INSIDE CONTAINERS.

UNUSUAL FIRE & EXPLOSION HAZARDS
STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR. A VIOLENT EXOTHERMIC REACTION OCCURS WITH WATER. SUFFICIENT HEAT MAY BE PRODUCED TO IGNITE COMBUSTIBLE MATERIALS.

TOXIC GASES PRODUCED
OXIDES OF NITROGEN, HYDROGEN

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3 (2 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 10 MG/M3 (4 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 5 MG/M3 (2 PPM)

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J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
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SECTION V - HEALTH HAZARD DATA (CONTINUED)

TOXICITY OF COMPONENTS

MSDS #1384

INTRAPERITONEAL MOUSE LD50 FOR WATER	190	G/KG
INTRAVENOUS MOUSE LD50 FOR WATER	25	G/KG

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY
NONE IDENTIFIED.

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: SEVERE IRRITATION OR BURNS OF RESPIRATORY SYSTEM, COUGHING, DIFFICULT BREATHING, CHEST PAINS, PULMONARY EDEMA, LUNG INFLAMMATION, UNCONSCIOUSNESS, AND MAY BE FATAL

SKIN CONTACT: SEVERE IRRITATION OR BURNS

EYE CONTACT: SEVERE IRRITATION OR BURNS

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NAUSEA, VOMITING, SEVERE BURNS, ULCERATION - MOUTH, THROAT, STOMACH, AND MAY BE FATAL

CHRONIC EFFECTS: DAMAGE TO LUNGS, TEETH

TARGET ORGANS
EYES, SKIN, MUCOUS MEMBRANES, RESPIRATORY SYSTEM, LUNGS, TEETH, GI TRACT

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
DAMAGED SKIN, EYE DISORDERS, CARDIOPULMONARY DISEASE, LUNG DISEASE

PRIMARY ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

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SECTION V - HEALTH HAZARD DATA (CONTINUED)

EMERGENCY AND FIRST AID PROCEDURES MSDS #.1384

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE:	YES	CONTAINS NITRIC ACID (RQ = 1,000 LBS, TPQ = 1,000 LBS)
CERCLA HAZARDOUS SUBSTANCE:	YES	CONTAINS NITRIC ACID (RQ = 1000 LBS)
TOXIC CHEMICALS:	YES	CONTAINS NITRIC ACID
GENERIC CLASS:		C16
TSCA INVENTORY:	YES	

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, LIGHT, MOISTURE

INCOMPATIBLES: STRONG BASES, CARBONATES, SULFIDES, CYANIDES, COMBUSTIBLE MATERIALS, ORGANIC MATERIALS, STRONG REDUCING AGENTS, MOST COMMON METALS, POWDERED METALS, CARBIDES, AMMONIUM HYDROXIDE, WATER, ALCOHOLS

DECOMPOSITION PRODUCTS: OXIDES OF NITROGEN, HYDROGEN

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SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.
KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL.

J. T. BAKER NEUTRASORB(R) OR TEAM* 'LOW NA+' ACID NEUTRALIZERS ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D001, D002 (IGNITABLE, CORROSIVE WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 100 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: YELLOW (REACTIVE)

STORAGE REQUIREMENTS
KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE AND COMBUSTIBLE MATERIALS. ISOLATE FROM INCOMPATIBLE MATERIALS. KEEP PRODUCT OUT OF LIGHT.

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EFFECTIVE: 05/01/89 MSDS # 1384 ISSUED: 05/16/89

SECTION X — TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: NITRIC ACID (OVER 40%)
HAZARD CLASS: OXIDIZER
UN/NA: UN2031 REPORTABLE QUANTITY: 1000 LBS.
LABELS: OXIDIZER, CORROSIVE
REGULATORY REFERENCES: 49CFR 172.101; 173.268

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: NITRIC ACID
HAZARD CLASS: 8 I.M.O. PAGE: 8107
UN: UN2031 MARINE POLLUTANTS: NO PACKAGING GROUP: II
LABELS: CORROSIVE
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: NITRIC ACID
HAZARD CLASS: 8
UN: UN2031 PACKAGING GROUP: II
LABELS: CORROSIVE
REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 2808000000

N/A = NOT APPLICABLE OR NOT AVAILABLE
N/E = NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.
EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES

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J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
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ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.
THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. IF YOU HAVE ANY QUESTIONS, PLEASE CALL CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

— LAST PAGE —

MATERIAL SAFETY DATA SHEET

FOR COATINGS • RESINS AND RELATED MATERIALS MSDS #15365

DATE OF PREPARATION- 7/23/87 PAGE 1

MANUFACTURER S NAME : COLUMBIA PAINT COMPANY
ADDRESS : NORTH 112 HAVEN STREET
ADDRESS : P.O. BOX 4964
CITY,STATE : SPOKANE, WA 99202

EMERGENCY TELEPHONE NO. DAY: 509-535-9741 NIGHT:
INFORMATION TELEPHONE NO. DAY: 509-535-9741 NIGHT:

SECTION I -- PRODUCT IDENTIFICATION

MANUFACTURER S CODE IDENTIFICATION: 05-421-FR
PRODUCT CLASS:
TRADE NAME: LATEX BASE FIRE RETARDANT PAINT

SECTION II HAZARDOUS INGREDIENTS

INGREDIENT MATERIAL DESCRIPTION	CAS#	% BY WEIGHT	TLV-(TWA) PPM	TLV-(TWA) MG/M3	LEL	VAPOR PRESS MMHG	DES
ETHYLENE GLYCOL	107211	1.97	50.00	125.00	3.2	.05	
ALUMINUM OXIDE	1344281	7.54	NOT EST	10.00	UNK.	UNKNOWN	

SECTION III PHYSICAL DATA

BOILING RANGE	HIGH	471.0 DF	LOW	212.0 DF
VAPOR PRESSURE	SEE SECTION II			
VAPOR DENSITY	-N/A			
EVAPORATION RATE	-N/A			
WEIGHT PER GALLON	13.0			
% VOLATILE BY VOLUME	41.6			
% VOLATILE BY WEIGHT	26.3			

MATERIAL SAFETY DATA SHEET PAGE

MANUFACTURER'S CODE: 05-421-FR DATE OF PREPARATION: 7/

TRADE NAME:

MSDS #15365

VENTILATION: ALL APPLICATION AREAS SHOULD BE VENTILATED IN ACCORDANCE WITH OSHA REGULATIONS. POCKETS OF HEAVY AND/OR FLAMMABLE VAPOR MUST NOT BE PERMITTED TO FORM. VENTILATION AND RESPIRATORY PROTECTION MUST BE ADEQUATE TO PREVENT THE TLV'S OF HAZARDOUS INGREDIENTS FROM BEING EXCEEDED.

PROTECTIVE GLOVES: REQUIRED FOR PROLONGED OR REPEATED CONTACT.

EYE PROTECTION: USE SAFETY EYEWEAR WITH SPLASH GUARDS OR SIDE SHIELDS.

OTHER PROTECTIVE EQUIPMENT: USE PROTECTIVE APRON AND CLOTHING.

HYGIENIC PRACTICES: WASH HANDS BEFORE EATING OR USING THE WASHROOM. SMOKE IN SMOKING AREAS ONLY.

MSDS # 11439

MATERIAL SAFETY DATA SHEET

NPCA 1-82

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor Essentially Similar to Form OSHA-20)

Section I

MANUFACTURER'S NAME
Preservative Paint Company

DATE OF PREP
July 8, 1983

STREET ADDRESS
5410 Airport Way South

CITY, STATE, AND ZIP CODE
Seattle, WA 98108

EMERGENCY TELEPHONE NO. 206/634-5252

PRODUCT CLASS

INFORMATION TELEPHONE NO.

MANUFACTURER'S CODE IDENTIFICATION 33-266

TRADE NAME Latex Black Traffic Paint

Section II—HAZARDOUS INGREDIENTS

INGREDIENTS	PERCENT	OCCUPATIONAL EXPOSURE LIMITS	VAPOR PRESSURE	TOXICITY DATA
Texanol - TMPDM 1-2, 2, 4	0.65			100 ppm
Mercury as metal for protection of hydroxy ethyl cellulose in form of phenyl mercury acetate	0.000024			

Section III—PHYSICAL DATA

BOILING RANGE Water 212°F

VAPOR DENSITY ☐ HEAVIER ☐ LIGHTER THAN AIR

EVAPORATION RATE ☐ FASTER ☐ SLOWER THAN ETHER

PERCENT VOLATILE BY VOLUME 57.82

WEIGHT PER GALLON 11.96

Section IV—FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION OSHA _____ DOT _____

FLASH POINT None °F

EXTINGUISHING MEDIA N/A

☐ FOAM ☐ ALCOHOL FOAM ☐ CO_2 ☐ DRY CHEMICAL ☐ WATER FOG ☐ OTHER

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to build up of steam pressure) when exposed to extreme heat.

MSDS # 11439

Section V—HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE

Inhalation: Ammonia odor irritation skin and eye contact. Possible primary irritation (material is slightly alkaline

EMERGENCY AND FIRST AID PROCEDURES Remove from exposure, splash eyes. Flush with water for 15 minutes, seek medical help. Splash skin: remove with soap and water

Section VI—REACTIVITY DATA

STABILITY ☐ UNSTABLE ☒ STABLE CONDITIONS TO AVOID

INCOMPATABILITY (Materials to avoid) Extreme heat

HAZARDOUS DECOMPOSITION PRODUCTS N/A

May produce carbon monoxide when heated to decomposition as in welding.

HAZARDOUS POLYMERIZATION ☐ MAY OCCUR ☐ WILL NOT OCCUR

Section VII—SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Contain and remove with inert absorbent

WASTE DISPOSAL METHOD

Dispose in accordance with waste state and federal regulations

Section VIII—SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION

VENTILATION

PROTECTIVE GLOVES OTHER PROTECTIVE EQUIPMENT

EYE PROTECTION

Goggles N/a

Section IX—SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Do not store below 32°F

OTHER PRECAUTIONS

MATERIAL SAFETY DATA SHEET

DAP, Inc.

Hanford's MSDS No.: 18060
LATEX CONCRETE SEALANT

MANUFACTURER INFORMATION

Product Trade Name: LATEX CONCRETE SEALANT
MSDS Date: 10/28/88

DAP, Inc.
P.O. Box 277
Dayton, OH 45401-0277
(800) 543-3840
(513) 667-4461 In Ohio
(800) 327-3339 Corporate Headquarters

Revision: 2

EMERGENCY Phone: (800) 543-3840
(513) 667-4461 In Ohio
(800) 327-3339 Corporate Headquarters

SECTION I - MATERIAL IDENTIFICATION

Mfg's Product ID: 10010

Mfg's MSDS ID: DAP/10010

CAS Number: Mixture

National Paint & Coatings Association HMIS Codes
Hazard Ratings: 0-Minimal; 1-Slight; 2-Moderate; 3-Serious; 4-Severe; *-Chronic

Health: 0 Fire: 0 Reactivity: 0 Personal: A - GLASSES

OTHER DESIGNATIONS (Synonyms) --------
LATEX CONCRETE SEALANT

Additional Information: PRODUCT DESCRIPTION: Sealant

MATERIAL SAFETY DATA SHEET

DAP, Inc.

Hanford's MSDS No.: 18060
LATEX CONCRETE SEALANT

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Ingredient Name	*CAS Number*	*Percent*	*Exposure Limits*
ETHYLENE GLYCOL	*107-21-1*	*< 3*	*PEL: 50 ppm (Ceiling)* *TLV: 50 ppm (Ceiling)*

Regulatory: SARA 313 Chemical

Additional Information: Remaining ingredients are not regulated by OSHA and are considered trade secrets.

SECTION III - PHYSICAL DATA

Appearance and Odor: Opaque paste with a mild odor.
Boiling Point: NA
Vapor Pressure: 17 mm Hg @ 20°F (Water)
Vapor Density: > 1.0 (Air = 1)
Water Solubility: Soluble
Specific Gravity: 1.46 (H_2O = 1)
Evaporation Rate: 1 (Water = 1)
Percent Volatile: <25 (by volume)
VOC: VOC less water less exempt solvent (grams/liter): 2
VOC material (grams/liter): 2

SECTION IV - FIRE AND EXPLOSION DATA

National Fire Protection Association Hazard Codes

Hazard Ratings: 0-None --> 4-Extreme

Health: 0 Fire: 0 Reactivity: 0 Special: a

Flammable Limits:

LEL(%): NA
UEL(%): NA

Flash Point (Method): None (C.C.)

MATERIAL SAFETY DATA SHEET

DAP, Inc.

Hanford's MSDS No.: 18060
LATEX CONCRETE SEALANT

--- SECTION IV - FIRE AND EXPLOSION DATA continued from page 2 ---

Extinguishing Media: Foam, carbon dioxide, dry chemicals.

Special Fire Fighting Procedures: Use water spray to cool exposed surfaces.

Unusual Fire and Explosion Hazards: None known.

SECTION V - REACTIVITY DATA

Stability: Material IS stable at room temperature.

Hazardous Polymerization: Will NOT occur.

CONDITIONS TO AVOID: Excessive heat.

Incompatabilities/Materials to Avoid: Strong oxidizers and caustics.

Hazardous Decomposition Products: Normal combustion products, i.e. CO_x, NO_x

SECTION VI - HEALTH HAZARDS

Effects of Exposure/Overexposure:
Acute: Overexposure of ethylene glycol by inhalation is unlikely since vapor pressure of product is low.

Chronic: Ingestion of ethylene glycol in excess may lead to respiratory and/or cardiac failure and kidney and liver damage.

Medical Conditions Aggravated: None known.

Routes of Entry: Ingestion

Cancer Statement: This product is NOT considered a carcinogen by IARC, NTP and OSHA.

MATERIAL SAFETY DATA SHEET

DAP, Inc.

Hanford's MSDS No.: 18060
LATEX CONCRETE SEALANT

SECTION VII - FIRST AID PROCEDURES

Eyes: Flush with large amounts of water for 15 minutes. Contact a physician.

Skin: Wash with soap and water.

Inhalation: Remove to fresh air. Contact a physician immediately.

Ingestion: Do not induce vomiting. Contact a physician immediately.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: STORAGE SEGREGATION: Store away from caustics and oxidizers.

Keep containers away from excessive heat and freezing. Keep containers tightly closed when not in use. Keep out of reach of children.

Personal Protection ----------
Respirator: None required. See Ventilation.

Eye Protection: Safety glasses recommended.

Gloves: Recommended for prolonged ar repeated contact with skin.

WORKPLACE CONTROLS ----------

Ventilation: Normal room ventilation.

Other Workplace Controls: CONTAMINATED EQUIPMENT: Wash contaminated clothing before reuse.

SAFETY STATIONS: Not required.

MATERIAL SAFETY DATA SHEET

DAP, Inc.

Hanford's MSDS No.: 18060
LATEX CONCRETE SEALANT

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: Use absorbent material or scrape up dried material and place into containers.

Waste Management/Disposal: Dispose of according to Federal, State and Local regulations. Discarded material should be incinerated at a permitted facility.

UN No: Not Applicable

NA Number: Not Applicable

DOT Hazard Class: Not Applicable
DOT Shipping Name: Not Applicable
DOT Labels/Placards: Not Applicable

Other Hazard Class: EPA Hazard Class - if discarded (40 CFR 261): Not Applicable

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

Manufacturer's Disclaimer: This data is offered in good faith as typical values and not as a product specification. No warranty, either expressed or implied is hereby made. The recommended industrial hygeine and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

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MATERIAL SAFETY DATA SHEET

FOR COATINGS , RESINS AND RELATED MATERIALS

DATE OF PREPARATION- 9/21/88 PAGE 1

MANUFACTURER S NAME : COLUMBIA PAINT COMPANY
ADDRESS : NORTH 112 HAVEN STREET
ADDRESS : P.O. BOX 4569
CITY,STATE : SPOKANE, WA 99202

MSDS #16196

EMERGENCY TELEPHONE NO. DAY: 509-535-9741 NIGHT:
INFORMATION TELEPHONE NO. DAY: 509-535-9741 NIGHT:

SECTION I -- PRODUCT IDENTIFICATION

MANUFACTURER S CODE IDENTIFICATION: 02-755-WB
PRODUCT CLASS: VINYL-ACRYLIC RESIN COATING
TRADE NAME: LATEX EGGSHELL ENAMEL - WHITE & LIGHT TINTS

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT MATERIAL DESCRIPTION	CAS #	% BY WEIGHT	TLV-(TWA) PPM	TLV-(TWA) MG/M3	LEL	VAPOR PRESS MMHG	VAPOR PRESS DEG F
LENE GLYCOL	#107211	* 1.67*	50.00*	125.00*	3.2*	.08	@ 68.0
2,4 TRIMETHYL PENTANE OL-1,3 MONOISOBUTYRATE	#25265774	* 1.25*	NOT EST*	NOT EST*	UNK. *	1.00	@189.0

SECTION III PHYSICAL DATA

BOILING RANGE	HIGH	471.0 DF	LOW	212.0 DF
VAPOR PRESSURE	SEE SECTION II			
VAPOR DENSITY	LIGHTER THAN AIR			
EVAPORATION RATE	SLOWER THAN ETHER			
WEIGHT PER GALLON	10.7			
% VOLATILE BY VOLUME	68.1			
% VOLATILE BY WEIGHT	53.3			

MATERIAL SAFETY DATA SHEET PAGE 2

MUFACTURER S CODE: 02-755-WB DATE OF PREPARATION- 9/21/88
ADE NAME: LATEX EGGSHELL ENAMEL - WHITE & LIGHT TINTS

SECTION IV -- FIRE AND EXPLOSION HAZARD DATA

AMMABILITY CLASSIFICATION OSHA-CLASS III-B DOT- NOT REGULATED
WEST FLASHPOINT T.C.C. 200.0 OF LOWER EXPLOSION LEVEL (LEL) 3.2 %

TINGUISHING MEDIA: ( )-FOAM ( )-CO2 MSDS # 16196
( )-DRY CHEMICAL (x)-WATER FOG ( )-OTHER"
UAL FIRE AND EXPLOSION HAZARDS: MATERIALS WILL NOT SUSTAIN COMBUSTION UNLESS WATER HAS EVAPORATED. CLOSED CONTAINERS MAY EXPLODE FROM STEAM PRESSURE WHEN EXPOSED TO EXTREME HEAT.
ECIAL FIRE FIGHTING PROCEDURES: FIREFIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS AS PROTECTION FROM HAZARDOUS COMBUSTION PRODUCTS.

SECTION V -- HEALTH HAZARD DATA

FECTS OF OVEREXPOSURE: EXCESS INHALATION OF VOLATILIZED AMMONIA MAY PRODUCE HEADACHE, NAUSEA, IRRITATION TO RESPIRATORY TRACT. SKIN CONTACT MAY PRODUCE IRRITATION DUE TO SLIGHT ALKALINITY. PRESENCE OF VOLATILIZED AMMONIA COULD IRRITATE EYES.
IMARY ROUTE(S) OF EXPOSURE: (X)-DERMAL (X)-INHALATION ( )-INGESTION
EMERGENCY AND FIRST AID PROCEDURES: FOR IRRITATION DUE TO INHALATION, REMOVE TO FRESH AIR. FOR EYE CONTACT, FLUSH WITH LARGE AMOUNTS OF WATER FOR 15 MINUTES. IN CASE OF INGESTION, DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY.
DICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: UNKNOWN.

SECTION VI -- REACTIVITY DATA

ABILITY: ( )-UNSTABLE (X)-STABLE
ZARDOUS POLYMERIZATION: ( )-MAY OCCUR (X)-WILL NOT OCCUR
ZARDOUS DECOMPOSITION PRODUCTS: THE DRY PAINT FILM CAN BURN AND PRODUCE ONE OR MORE OF THE FOLLOWING: CARBON DIOXIDE, CARBON MONOXIDE, HYDROGEN CHLORIDE, AND/OR OXIDES OF NITROGEN.
NDITIONS TO AVOID: EXCESSIVE HEAT.
COMPATIBILITY (MATERIALS TO AVOID): NONE REASONABLY FORESEEABLE.

SECTION VII -- SPILL OR LEAK PROCEDURES

EPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: WEARING PROTECTIVE GLOVES, WIPE UP LIQUID MATERIAL WITH ABSORBENT CLOTH.
STE DISPOSAL METHOD: DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.

SECTION VIII - SAFE HANDLING AND USE INFORMATION

SPIRATORY PROTECTION: IN RESTRICTED VENTILATION AREAS - APPROVED CHEMICAL/MECHANICAL FILTERS DESIGNED TO REMOVE PARTICULATES AND VAPOR.
NTILATION: PROVIDE AIR MOVEMENT TO REMOVE EXCESS VAPORS.
OTECTIVE GLOVES: REQUIRED FOR PROLONGED OR REPEATED CONTACT.
E PROTECTION: SAFETY GLASSES.
HER PROTECTIVE EQUIPMENT: NONE.
GIENIC PRACTICES: WASH HANDS BEFORE EATING OR USING WASHROOM.

SECTION IX -- SPECIAL PRECAUTIONS

ECAUTIONS TO BE TAKEN IN HANDLING AND STORING: DO NOT STORE IN EXCESSIVE HEAT (ABOVE 120 OF). USE WITH ADEQUATE VENTILATION.
HER PRECAUTIONS: AVOID CONTACT WITH EYES.

MSDS #11441

Series

MATERIAL SAFETY DATA SHEET

35 FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

UFACTURER'S NAME
DUTCH BOY PAINTS,
P.O. Box 6789
Cleveland, Ohio 44101

EMERGENCY TELEPHONE NO.
(216) 566-2917

TE OF PREPARATION
15-Jul-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

ODUCT NAME
Latex Floor Paint

* - Trade Mark

ODUCT NUMBERS AND COLORS

71-10	White	71-62	Powder Gray
71-36	Autumn Brown	71-66	Masonry Gray
71-56	Patio Red	71-84	Tile Green

--- Including COLOR GALLERY II Colors ---

ODUCT CLASS
Latex Paint

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.
112-34-5	2-(2-Butoxyethoxy)-ethanol	<5	50.	330.	0.9	
107-21-1	Ethylene Glycol.	<5	50.	125.	3.2	0.1

- 8.9

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether
VAPOR DENSITY -- Heavier than Air

ILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
212 - 448	67-72	9.5-10.5

Section IV -- FIRE AND EXPLOSION HAZARD DATA

AMMABILITY CLASSIFICATION
Not Applicable

FLASH POINT >199 F PMCC

LEL N.A.

TINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam

USUAL FIRE AND EXPLOSION HAZARDS
Extreme heat may cause closed containers to burst.

ECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. ter spray may be ineffective. If water is used, fog nozzles are preferable. Water may be ed to cool closed containers to prevent pressure build-up and possible autoignition or plosion when exposed to extreme heat.

Section V -- HEALTH HAZARD DATA

RESHOLD LIMIT VALUE -- See Section II

FECTS OF OVEREXPOSURE

ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure may result in lightheadedness and staggering gait.
Irritant to skin and upper respiratory system.

Continued on page 2

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EMERGENCY AND FIRST AID PROCEDURES
If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
If in EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.

Section VI -- REACTIVITY DATA

STABILITY -- Stable
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.
WASTE DISPOSAL METHOD
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.
Protect against dust which may be generated by sanding or abrading the dried film.
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear respiratory device approved by NIOSH/MSHA for protection against materials in Section II.
PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials in Section II.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

Section IX -- PRECAUTIONS

DOL STORAGE CATEGORY -- 3B
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.
OTHER PRECAUTIONS
This coating contains materials classified as nuisance particulates, for example titanium dioxide, calcium carbonate, etc. (see ACGIH TLV List, Preface and Appendix D), which may be present at hazardous levels only during sanding or abrading of the dried film.

This Material Safety Data Sheet conforms to the Hazard Communication standard, 29 CFR 1910.1200(g)(4), for similar complex mixtures.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

MSDS # 7744

MATERIAL SAFETY DATA SHEET MSDS #15599

85 FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURER'S NAME
DUTCH BOY PAINTS
P.O. Box 6709
Cleveland, Ohio 44101

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION
17-Jul-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NAME
Latex Gloss & Trim Enamel

® - Trade Mark

PRODUCT NUMBERS AND COLORS

74-03	Pastel Base	74-37	Brown
74-05	Deep Base	74-42	Yellow
74-07	Medium Base	74-59	Red
74-08	Light Base	74-79	Blue
74-09	Ultra Deep Base	74-89	Dark Green
74-10	Gloss White	74-90	Gloss Black
74-12	Almond		

--- Including COLOR GALLERY II Colors ---

PRODUCT CLASS
Latex Paint

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.
107-21-1	Ethylene Glycol.	<5	50.	125.	3.2	0.1

pH - 9.5

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether
VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
212 - 388	60-70	8.7-10.5

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION — FLASH POINT >199 F PMCC — LEL N.A.
Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Extreme heat may cause closed containers to burst.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section V -- HEALTH HAZARD DATA MSDS #15599

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE

ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure may result in lightheadedness and staggering gait.
Irritant to skin and upper respiratory system.

EMERGENCY AND FIRST AID PROCEDURES

If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

If on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.

If in EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.

Section VI -- REACTIVITY DATA

STABILITY -- Stable

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.

Protect against dust which may be generated by sanding or abrading the dried film.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, use a respiratory device approved by NIOSH/MSHA for protection against materials in Section II.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section II.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

Section IX -- PRECAUTIONS MSDS #15599

D. STORAGE CATEGORY -- 3B

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

OTHER PRECAUTIONS

This coating contains materials classified as nuisance particulates, for example titanium dioxide, calcium carbonate, etc. (see ACGIH TLV List, Preface and Appendix D), which may be present at hazardous levels only during sanding or abrading of the dried film.

This Material Safety Data Sheet conforms to the Hazard Communication standard, 29 CFR 1910.1200(g)(4), for similar complex mixtures.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

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MATERIAL SAFETY DATA SHEET

85A

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURER'S NAME
DUTCH BOY PAINTS
P.O. Box 6709
Cleveland, Ohio 44101

EMERGENCY TELEPHONE
(216) 566-2917

MSDS # 1560

DATE OF PREPARATION
10-Oct-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NAME
Latex House Paint

* - Trade Mark

PRODUCT NUMBERS AND COLORS

17-03	Pastel Base	17-44	Cape Cod Yellow
17-05	Deep Base.	17-48	Golden Eagle
17-07	Medium Base	17-58	Rancho
17-08	Light Base	17-62	Soft Gray
17-09	Ultra Deep Base	17-66	Quarry Gray
17-10	White	17-68	Charcoal Gray
17-21	Monterey Yellow	17-76	Pilgrim Blue
17-24	Pecanwood	17-83	Apple Green
17-32	Beechwood Beige	17-86	Lexington Green
17-36	Woodland Oak	17-87	Concord Green
17-38	Cocoa Brown	17-90	Black

--- Including COLOR GALLERY II Colors ---

PRODUCT CLASS
Latex Paint

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.
107-21-1	Ethylene Glycol.	0-5	50.	125.	3.2	0.1
	Crystalline Silica (Cristobalite)	0-4	Refer to OSHA Standard (29 CFR 1910.1000, Table Z-3)			

pH - 9.4

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether
VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
212 - 388	59-63	10.2-11.6

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION
Not Applicable

FLASH POINT >199 F PMCC

LEL N.A.

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Extreme heat may cause closed containers to burst.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Continued on page 2

Section V -- HEALTH HAZARD DATA MSDS # 15601

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE

ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure ma, result in lightheadedness and staggering gait.
Irritant to skin and upper respiratory system.

EMERGENCY AND FIRST AID PROCEDURES

If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

If on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.

If in EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.

Section VI -- REACTIVITY DATA

STABILITY -- Stable

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.

Protect against hazardous dust or fumes which may be generated by sanding, wirebrushing, abrading, burning, brazing or welding of the dried film.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear respiratory device approved by NIOSH/MSHA for protection against materials in Section II.

PROTECTIVE GLOVES

Wear gloves which are recommended by glove supplier for protection against materials in Section II.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

Section IX -- PRECAUTIONS MSDS #15601

OL STORAGE CATEGORY -- 3B

RECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

OTHER PRECAUTIONS

This coating contains materials classified as nuisance particulates, for example titanium dioxide, calcium carbonate, etc. (see ACGIH TLV List, Preface and Appendix D), which may be present at hazardous levels only during sanding or abrading of the dried film.

This Material Safety Data Sheet conforms to the Hazard Communication standard, 29 CFR 1910.1200(g)(4), for similar complex mixtures.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

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72-01

MATERIAL SAFETY DATA SHEET MSDS # 15387

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor 'Essentially Similar' to form OSHA-20)

MANUFACTURER'S NAME
DUTCH BOY PAINTS
P.O. Box 6709
Cleveland, Ohio 44101

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION
24-Jun-85

INFORMATION TELEPHONE NO.
(216) 566-2902

Section I -- PRODUCT IDENTIFICATION

PRODUCT NUMBER
72-01

® - Trade Mark

PRODUCT NAME
Latex Interior Speed Primer, White

PRODUCT CLASS
Latex Paint

Section II -- HAZARDOUS INGREDIENTS

CAS No.	INGREDIENT	PERCENT	TLV-PPM	TLV-MG/M3	LEL	V.P.

NO INGREDIENTS IN THIS PRODUCT ARE HAZARDOUS AS DEFINED BY THE DEPARTMENT OF LABOR.

pH - 8.2

Section III -- PHYSICAL DATA

EVAPORATION RATE -- Slower than Ether
VAPOR DENSITY -- Heavier than Air

BOILING RANGE (F)	% VOLATILE VOLUME	WT/GAL
212 - 212	68.6	10.29

Section IV -- FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION — FLASH POINT >199 F PMCC — LEL N.A.
Not Applicable

EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS
Extreme heat may cause closed containers to burst.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section V -- HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE -- See Section II

EFFECTS OF OVEREXPOSURE

ACUTE: In a confined area vapors in high concentration are anesthetic. Overexposure may result in lightheadedness and staggering gait.
Irritant to skin and upper respiratory system.

Continued on page 2

MSDS #15987

EMERGENCY AND FIRST AID PROCEDURES

If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and qu[illegible]
If on SKIN: Wash affected area thoroughly with soap and water.
If in EYES: Flush eyes with large amounts of water for 15 minutes.
Get medical attention.

Section VI -- REACTIVITY DATA

STABILITY -- Stable

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide; Carbon Monoxide

HAZARDOUS POLYMERIZATION -- Will Not Occur

Section VII -- SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

WASTE DISPOSAL METHOD

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section VIII -- PROTECTION INFORMATION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.

Protect against dust which may be generated by sanding or abrading the dried film.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear respiratory device approved by NIOSH/MSHA for protection against materials in Section II.

PROTECTIVE GLOVES

Required for long or repeated contact.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

Section IX -- PRECAUTIONS

DOL STORAGE CATEGORY -- 3B

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

OTHER PRECAUTIONS

This coating contains materials classified as nuisance particulates, for example titanium dioxide, calcium carbonate, etc. (see ACGIH TLV List, Preface and Appendix D), which may be present at hazardous levels only during sanding or abrading of the dried film.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

MATERIAL SAFETY DATA SHEET
WESTERN DIVISION

MSDS # 14468

MANUFACTURER'S NAME
Benjamin Moore & Co.
51 Chestnut Ridge Road
DATE OF PREPARATION
January, 1987

EMERGENCY TELEPHONE NUMBER
(201) 344-1200

INFORMATION TELEPHONE NUMBER
(201) 344-1200

SECTION I - PRODUCT IDENTIFICATION

PRODUCT CLASS - WATER THINNED PAINT

PRODUCT NUMBER	PRODUCT NAME
026	Moortone Latex House Paint
064	Western Finishes Latex House Paint
089	Moorwood Vinyl Acrylic Latex Stain
090	Western Finishes Vinyl Acrylic Exterior Stain & Sealer
096	Moorglo Latex House & Trim Paint
102	Moore's Latex Exterior Primer
103	Moorgard Latex House Paint
105	Moore's Masonry and House Paint
122	Moore's Latex Floor & Patio Enamel
139	Tempgard Vinyl Roof Coating
141	Moorcraft Satin Fill Satin Finish Vinyl Acrylic Coating
144	Moorcraft Latex House Paint
145	Moorcraft Block Filler
155	Ironclad Galvanized Metal Primer
162	Ironclad Retard-X Rust Inhibitive Latex Primer
201	Moore's Latex Quick-Dry Prime Seal
203	Wall Grip
211	Moortone Vinyl Latex Flat Paint
213	Moortone Latex Satin Finish Enamel
215	Regal Wall Satin
220	Ironclad Retardo Latex Fire Retardant Paint
222	Enhance Vinyl Latex Flat
232	Enhance Latex Satin Finish Enamel
243	Moorcraft Latex Eggshell Enamel
251	Moorcraft Vinyl Latex Flat
252	Moorcraft Vinyl Latex Primer Sealer
255	Moorcraft Latex Satin Finish Enamel
258	Muresco Latex Ceiling Paint
308	Ironclad Latex High Gloss Enamel
309	Impervex Latex High Gloss Enamel
310	Regal Aquapearl
315	Interior-Exterior Latex Flat
316	Interior Latex Satin Enamel
319	Regal Aquavelvet
328	Decor-Kraft Vinyl Latex Flat
329	Decor-Kraft Latex Satin Enamel
331	Mest-Pro Vinyl Latex Flat
333	Regal Aquaglo
335	Pro-Vyn-Al Interior Wall Primer
337	Northwest Latex Eggshell
338	Vel-Pro 800 Vinyl Latex Flat
339	Vel-Pro 900 Latex Satin Finish
342	MVP/Pro-Vyn-Al
345	Moore's Latex Enamel Underbody
349	Pro-Vyn-Al Latex Semi-Gloss Enamel
362	Western Finishes Interior-Exterior Vinyl Latex Flat
367	Western Finishes Latex Satin Enamel
369	Western Finishes PVA Latex Primer Sealer
386	Moore's Latex Texture Paint Sand Finish
387	Moore's Latex Texture Paint Rough Finish
388	Moore's Latex Texture Paint Spanish Stucco Finish
415	Moore's Interior Wood Finishes Latex Urethane Acrylic High Gloss
416	Moore's Interior Wood Finishes Latex Urethane Acrylic Satin Finish

MSDS # 14468

MATERIAL SAFETY DATA SHEET
WESTERN DIVISION

MANUFACTURER'S NAME
Benjamin Moore & Co.
51 Chestnut Ridge Road
DATE OF PREPARATION
January, 1987

EMERGENCY TELEPHONE NUMBER
(201) 344-1200

INFORMATION TELEPHONE NUMBER
(201) 344-1200

SECTION I - PRODUCT IDENTIFICATION

PRODUCT CLASS - WATER THINNED PAINT

PRODUCT NUMBER	PRODUCT NAME
026	Moortone Latex House Paint
064	Western Finishes Latex House Paint
089	Moorwood Vinyl Acrylic Latex Stain
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096	Moorglo Latex House & Trim Paint
102	Moore's Latex Exterior Primer
103	Moorgard Latex House Paint
105	Moore's Masonry and House Paint
122	Moore's Latex Floor & Patio Enamel
129	Tempgard Vinyl Roof Coating
141	Moorcraft Satin Fill Satin Finish Vinyl Acrylic Coating
144	Moorcraft Latex House Paint
145	Moorcraft Block Filler
155	Ironclad Galvanized Metal Primer
162	Ironclad Retard-X Rust Inhibitive Latex Primer
201	Moore's Latex Quick-Dry Prime Seal
203	Wall Grip
211	Moortone Vinyl Latex Flat Paint
213	Moortone Latex Satin Finish Enamel
215	Regal Wall Satin
220	Ironclad Retardo Latex Fire Retardant Paint
222	Enhance Vinyl Latex Flat
232	Enhance Latex Satin Finish Enamel
243	Moorcraft Latex Eggshell Enamel
251	Moorcraft Vinyl Latex Flat
252	Moorcraft Vinyl Latex Primer Sealer
255	Moorcraft Latex Satin Finish Enamel
258	Muresco Latex Ceiling Paint
304	Ironclad Latex High Gloss Enamel
309	Impervex Latex High Gloss Enamel
310	Regal Aquapearl
315	Interior-Exterior Latex Flat
316	Interior Latex Satin Enamel
319	Regal Aquavelvet
328	Decor-Kraft Vinyl Latex Flat
329	Decor-Kraft Latex Satin Enamel
331	Mext-Pro Vinyl Latex Flat
333	Regal Aquaglo
335	Pro-Vyn-Al Interior Wall Primer
337	Northwest Latex Eggshell
338	Vol-Pro 800 Vinyl Latex Flat
339	Vol-Pro 900 Latex Satin Finish
342	MVP/Pro-Vyn-Al
345	Moore's Latex Enamel Underbody
349	Pro-Vyn-Al Latex Semi-Gloss Enamel
352	Western Finishes Interior-Exterior Vinyl Latex Flat
357	Western Finishes Latex Satin Enamel
359	Western Finishes PVA Latex Primer Sealer
356	Moore's Latex Texture Paint Sand Finish
357	Moore's Latex Texture Paint Rough Finish
358	Moore's Latex Texture Paint Spanish Stucco Finish
415	Moore's Interior Wood Finishes Latex Urethane Acrylic High Gloss
416	Moore's Interior Wood Finishes Latex Urethane

MSDS # 14468

WESTERN DIVISION

MANUFACTURER'S NAME
Benjamin Moore & Co.
51 Chestnut Ridge Road, Montvale, NJ 07645

EMERGENCY TELEPHONE NUMBER
(201) 344-1200

DATE OF PREPARATION
January, 1987

INFORMATION TELEPHONE NUMBER
(201) 344-1200

SECTION I - PRODUCT IDENTIFICATION

PRODUCT CLASS - WATER THINNED PAINT

PRODUCT NUMBER	PRODUCT NAME
329	Decor-Kraft Latex Satin Enamel
328	Decor-Kraft Vinyl Latex Flat
232	Enhance Latex Satin Finish Enamel
222	Enhance Vinyl Latex Flat
309	Impervex Latex High Gloss Enamel
315	Interior-Exterior Latex Flat
316	Interior Latex Satin Enamel
155	Ironclad Galvanized Metal Primer
308	Ironclad Latex High Gloss Enamel
162	Ironclad Retard-X Rust Inhibitive Latex Primer
220	Ironclad Retardo Latex Fire Retardant Paint
342	MVP/Pro-Vyn-Al
145	Moorcraft Block Filler
243	Moorcraft Latex Eggshell Enamel
144	Moorcraft Latex House Paint
255	Moorcraft Latex Satin Finish Enamel
141	Moorcraft Satin Fill Satin Finish Vinyl Acrylic Coatin
251	Moorcraft Vinyl Latex Flat
252	Moorcraft Vinyl Latex Primer Sealer
415	Moore's Interior Wood Finishes Latex Urethane Acrylic High Gloss
416	Moore's Interior Wood Finishes Latex Urethane Acrylic Satin Finish
145	Moore's Latex Enamel Underbody
102	Moore's Latex Exterior Primer
122	Moore's Latex Floor and Patio Enamel
201	Moore's Latex Quick-Dry Prime Seal
387	Moore's Latex Texture Paint Rough Finish
386	Moore's Latex Texture Paint Sand Finish
388	Moore's Latex Texture Paint Spanish Stucco Finish
105	Moore's Masonry and House Paint
103	Moorgard Latex House Paint
096	Moorglo Latex House and Trim Paint
026	Moortone Latex House Paint
213	Moortone Latex Satin Finish Enamel
211	Moortone Vinyl Latex Flat Paint
089	Moorwood Vinyl Acrylic Latex Stain
258	Muresco Latex Ceiling Paint
337	Northwest Latex Eggshell
335	Pro-Vyn-Al Interior Wall Primer
349	Pro-Vyn-Al Latex Semi-Gloss Enamel
333	Regal Aquaglo
310	Regal Aquapearl
319	Regal Aquavelvet
215	Regal Wall Satin
139	Tempgard Vinyl Roof Coating
328	Val-Pro 800 Vinyl Latex Flat
329	Val-Pro 900 Latex Satin Finish
201	Wall Grip
331	West-Pro Vinyl Latex Flat
362	Western Finishes Interior-Exterior Vinyl Latex Flat
064	Western Finishes Latex House Paint
367	Western Finishes Latex Satin Enamel
365	Western Finishes PVA Primer Sealer
090	Western Finishes Vinyl Acrylic Exterior Stain & Sealer

SECTION II - HAZARDOUS INGREDIENTS NOT APPLICABLE

MSDS # 14468

[redacted] products are non-combustible water emulsion paints formulated without lead or mercury.

They are not hazardous substances under current Department of Labor definitions. This MSDS complies with 29 CFR1910. 1200.

SECTION III - PHYSICAL DATA NOT APPLICABLE

SECTION IV - FIRE AND EXPLOSION HAZARD NOT APPLICABLE

SECTION V - HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE - CONTACT WITH EYE, PRIMARY IRRITATION.
MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE - UNKNOWN
PRIMARY ROUTE(S) OF ENTRY - DERMAL INHALATION INGESTION
EMERGENCY AND FIRST AID PROCEDURES - FLUSH EYES WITH CLEAN WATER. IF IRRITATION PERSISTS CALL PHYSICIAN.

SECTION VI - REACTIVITY DATA

STABILITY STABLE
HAZARDOUS POLYMERIZATION WILL NOT OCCUR
HAZARDOUS DECOMPOSITION PRODUCTS - NOT APPLICABLE
CONDITIONS TO AVOID - NOT APPLICABLE
INCOMPATIBILITY (MATERIALS TO AVOID) - NOT APPLICABLE

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED - FLUSH WITH WATER. ABSORB WITH SAWDUST OR RAGS.
WASTE DISPOSAL METHOD - CONVENTIONAL METHODS IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.

SECTION VIII - SAFE HANDLING AND USE INFORMATION

RESPIRATORY PROTECTION - NOT APPLICABLE
VENTILATION - NOT APPLICABLE
PROTECTIVE GLOVES - WATERPROOF DURING REPEATED CONTACT
EYE PROTECTION - SAFETY GLASSES TO PROTECT AGAINST SPLASHES
OTHER PROTECTIVE EQUIPMENT - NOT APPLICABLE
HYGIENIC PRACTICES - NOT APPLICABLE

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING - DO NOT THROW OR DROP CONTAINERS
OTHER PRECAUTIONS - DO NOT T E INTERNALLY. CLOSE CONTAINER AFTER EACH USE. AVOID CONTACT WITH E , AND PROLONGED CONTACT WITH SKIN OR BREATHING OF SPRAY MIST. KEEP A Y FROM CHILDREN

Monsanto MATERIAL SAFETY DATA MSDS #19093

MONSANTO PRODUCT NAME

Polychlorinated Biphenyls (PCBs)

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO 63167

Emergency Phone No.
(Call Collect)
314-694-1000

Date: 10/88

PRODUCT IDENTIFICATION

Synonyms: PCBs
Chlorodiphenyl (__% Cl)
Chlorinated biphenyl
Polychlorinated biphenyl
Chlorinated biphenyls
(approx. __% Cl)

Trade Names/ Common Names: Aroclor®[1] Series 1016, 1221, 1232, 1242, 1248, 1254, 1260
Therminol®[1] FR Series

PYRANOL®[2] and INERTEEN®[3] are trademarks for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL - Generic name for a broad class of fire-resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30-70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

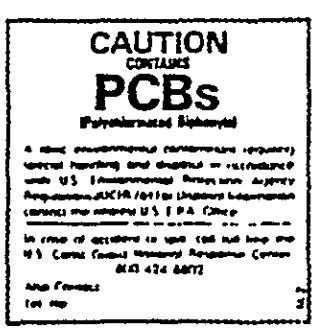
This list of trade names is representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Japanese companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

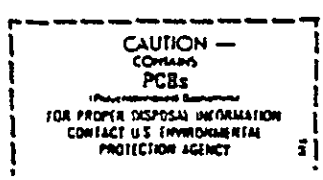
[1] Registered trademark of Monsanto Company
[2] Registered trademark of General Electric Company
[3] Registered trademark of Westinghouse Electric Corporation

CAS No.'s: 001336363, 053469219, 021672296, 01109769, 011096825 and others

WARNING STATEMENTS

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked. (check regulations, 40 CFR 761, for details)





PRECAUTIONARY MEASURES

Care should be taken to prevent entry into the environment through spills, leakage, use, vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

EMERGENCY AND FIRST AID PROCEDURES

Ingestion: Consult a physician. Do not induce vomiting or give any oily laxatives. NOTE TO PHYSICIAN—If large amounts are ingested, gastric lavage is suggested.

Skin: If liquid or solid PCBs are splashed or spilled on skin, contaminated clothing should be removed and the skin washed thoroughly with soap and water. NOTE TO PHYSICIAN—Hot PCBs may cause thermal burns.

Eyes: Eyes should be irrigated immediately with copious quantities of running water for at least 15 minutes if liquid or solid PCBs get into them. A petrolatum-based opthalmic ointment may be applied to the eye to relieve the irritating effects of PCBs.

Inhalation: Remove to fresh air. If skin rash or respiratory irritation persists, consult a physician. NOTE TO PHYSICIAN—If electrical equipment arcs over, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce HCl, hydrochloric acid, a respiratory irritant.

OCCUPATIONAL CONTROL PROCEDURES

Eye Protection: Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.

Skin Protection: Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

ATTENTION! Repeated or prolonged contact may cause chloracne in some people.

Respiratory Protection: Avoid breathing vapor or mist. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.

Ventilation: Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Airborne Exposure Limits: Chlorinated biphenyl (approximately 42% chlorine)

OSHA PEL: 1 mg/m³ 8-hour time-weighted average - Skin*
ACGIH TLV: 1 mg/m³ 8-hour time-weighted average - Skin*
2 mg/m³ short-term exposure limit - Skin*

**Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.*

(OCCUPATIONAL CONTROL PROCEDURES continued on page 3)

OCCUPATIONAL CONTROL PROCEDURES *(continued)*

Airborne Exposure Limits (Continued): Chlorinated biphenyl (approximately 54% chlorine)

OSHA PEL: 0.5 mg/m³ 8-hour time-weighted average - Skin*
ACGIH TLV: 0.5 mg/m³ 8-hour time-weighted average - Skin*
1 mg/m³ short-term exposure limit - Skin*

**Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.*

FIRE PROTECTION INFORMATION

Fire and Explosion: PCBs are fire-resistant compounds. They may decompose to form CO, CO_2, HCl, phenolics, aldehydes and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

At temperatures in the range of 600-650°C in the presence of excess of oxygen PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

PCBs in electrical equipment have been reported to produce both chlorinated dioxins (PCDDs) and furans (PCDFs) during fire situations. These combustion products may result all, or in part, from non-PCB components of the dielectric fluids or other combusted materials. Consult the equipment manufacturer for information regarding composition of the dielectric fluids in electrical apparatus.

Standard fire fighting wearing apparel and self-contained breathing apparatus should be worn when fighting fires that involve possible exposure to chemical combustion products. Fire fighting equipment should be thoroughly cleaned and decontaminated after use.

Federal regulations require all PCB transformers to be registered with fire response personnel.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state, and local regulations.

REACTIVITY DATA

PCBs are very stable, fire-resistant compounds.

HEALTH EFFECTS SUMMARY

Skin Contact: PCBs can be absorbed through intact skin. Local action on skin is similar to that of common organic solvents where contact leads to removal of natural fats and oils with subsequent drying and cracking of the skin. A potential exists for contracting chloracne.

Eye Contact: The liquid products and their vapors are moderately irritating to eye tissues.

Ingestion: The acute oral toxicities of the undiluted compounds are: LD_{50} rats—8.65 gm/kg for 42% chlorinated, and 11.9 gm/kg for 54% chlorinated—"slightly toxic."

Inhalation: Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

(HEALTH EFFECTS SUMMARY continued on page 4)

HEALTH EFFECTS SUMMARY *(continued)*

Other:

There are literature reports that PCBs can impair reproductive functions in monkeys. The National Cancer Institute performed a study in 1977 using Aroclor 1254 with both sexes of rats. NCI stated that the PCB, Aroclor 1254, was not carcinogenic under the conditions of their bioassay. There is sufficient evidence in the scientific literature to conclude that Aroclor 1260 can cause liver cancer when fed to rodents at high doses. Similar experiments with less chlorinated PCB products have produced negative or equivocal results.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and non-worker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposures and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs can cause dermatological symptoms; however, these are reversible upon removal of exposure source.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Fourth).

PHYSICAL DATA

PROPERTIES OF SELECTED AROCLORS*

PROPERTY	1016	1221	1232	1242	1248	1254	1260
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25°C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-196	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1800-2500 390-540	— —

NA—Not Available

SPILL, LEAK & DISPOSAL INFORMATION

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any disposal of PCBs, PCB items, or PCB-contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All non-essential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. See Occupational Control Procedures section of this MSDS.

Personnel trained in the emergency procedures and protected against the attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks and fight fires in PCB areas.

All wastes and residues containing PCBs (e.g., wiping cloths, absorbent material, used disposable protective gloves, clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

Various federal, state and local regulations may require immediate reporting of PCB spills and may also define spill clean-up levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill clean-up.

ENVIRONMENTAL INFORMATION

Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquids or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

ADDITIONAL COMMENTS

Polychlorinated Biphenyls

For regulatory purposes, under the Toxic Substances Control Act the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such substance (40 CFR Part 761).

Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many isomers and compounds that vary from mobile oily liquids to white crystalline solids and hard non-crystalline resins. Technical products vary in composition, in the degree of chlorination and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per molecule (54% chlorine). They are used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic and other industrial fluids, plasticizers, carbonless paper, paints, inks and adhesives.

In 1972 Monsanto restricted sales of PCBs to applications involving only closed electrical systems (transformers and capacitors). In 1977 all manufacturing and sales were voluntarily terminated. In 1979 EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

Monsanto MATERIAL SAFETY DATA MSDS #19093

DATE: 10/1/88 **SUPERSEDES:** All prior to 10/1/88

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

John H. Craddock
Product & Environmental Safety Director

Paul R. Michael
Product & Environmental Safety Manager

Environmental Policy Staff
Monsanto Company
800 North Lindbergh Boulevard
St. Louis, Missouri 63167
(314) 694-4764

MATERIAL SAFETY DATA *Polychlorinated Biphenyls (PCBs)*

Monsanto

MSDS #19093

Monsanto Company
800 N Lindbergh Boulevard
St Louis, Missouri 63167
Phone: (314) 694-1000

October 9, 1989

Ms. Gail Black
Hanford Environmental Health Foundation
805 Goethals
Richland, Washington 99352

Dear Ms. Black:

In 1977, Monsanto voluntarily terminated all manufacturing and sales activities for polychlorinated biphenyls (PCBs). Because of numerous inquiries we developed a generic Material Safety Data Sheet (MSDS) for PCBs.

In response to your recent request, I am enclosing a copy of a newly revised (Oct. 1988) MSDS for PCBs. This MSDS conforms to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and is intended to provide general information for materials containing 99.9% or greater PCBs and does not relate to any specific formulations. For information about other ingredients in formulations containing PCBs, please contact the manufacturer of those ingredients. While this MSDS does not specifically mention Aroclor 1268, generally the same handling precautions should apply.

I hope this document will provide the information regarding PCBs, which is of interest to you.

Sincerely yours,

Paul R. Michael

Paul R. Michael, Ph.D.
Product & Environmental Safety Manager

ve
MSDS

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May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

MSDS # 1808)

IDENTITY (As Used on Label and List)
Radiacwash

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name
Atomic Products Corp.

Emergency Telephone Number
(516) 924-9000

Address (Number, Street, City, State, and ZIP Code)
49 Natcon Drive
Shirley, N 11967

Telephone Number for Information
(516) 924-9000

Date Prepared
2/22/88

Signature of Preparer (optional)
W. S. Gilman

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
1) Citric Acid	---	---		
2) Octyl Phenol Condensed with 8 - 10 moles Ethylene Oxide, Triton X100	CAS 9036195			
3) Tetrasodium Ethylenediamine Triacetate	CAS 15708415			
4) Benzyldimethyl (2-(2-(P- (1,1,3,3, tetra-methylbutyl) Phenoxy) Ethoxy) Ethyl) Ammonium Chloride, Hyamine 1622	CAS RN 121541			

Section III — Physical/Chemical Characteristics

Boiling Point	100°C	Specific Gravity (H_2O = 1)	1.052
Vapor Pressure (mm Hg.)	NA	Melting Point Freezing Point	0.3°C
Vapor Density (AIR = 1)	NA	Evaporation Rate (water = 1)	1.2

Solubility in Water
Infinite (completely miscible)

Appearance and Odor
Bluish transparent liquid - slightly pungent odor

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Greater than 214°F	NA		

Extinguishing Media
Dry powder, foam, carbon dioxide

Special Fire Fighting Procedures
Fire fighters should wear self-contained breathing apparatus.

Unusual Fire and Explosion Hazards
Decomposition products may be toxic.

(Reproduce locally) OSHA 174, Sept. 1985

MSDS # 18084

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	Metal nitrates

Incompatibility (Materials to Avoid): Metallic surfaces for prolonged time periods (pH 5)

Hazardous Decomposition or Byproducts:

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	None

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? No Skin? Yes Ingestion? Yes

Health Hazards (Acute and Chronic):
Prolonged contact of product with skin may cause irritation, possible allergic reaction.
Oral toxicity is low - LD50 Rate = >800 mg/kg

Carcinogenicity: NTP? None IARC Monographs? None OSHA Regulated? None

Signs and Symptoms of Exposure:
Repeated contact with skin may cause drying of skin and moderate irritation.
Some allergic properties experienced.

Medical Conditions Generally Aggravated by Exposure: Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to product.

Emergency and First Aid Procedures:
Inhalation: Remove to fresh air. Eyes: Flush with water for at least 15 minutes.
Skin: Wash thoroughly with soap and water, Ingestion: Drink plenty of water, call physician

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled:
Soak up material with absorbant materials and place in tight container.

Waste Disposal Method:
Place in appropriate disposal facility in compliance with Federal, State and Local regulations.

Precautions to Be Taken in Handling and Storing:
Store in closed containers away from heat.

Other Precautions:
None

Section VIII — Control Measures

Respiratory Protection (Specify Type):
Wear NIOSH approved respirator if required

Ventilation	Local Exhaust: In open areas	Special: None
	Mechanical (General): In confined areas	Other: None

Protective Gloves: Impervious gloves
Eye Protection: Goggles

Other Protective Clothing or Equipment:
Barrier creams, aprons, overalls to avoid contact.

Work/Hygienic Practices:
Observe conditions of good industrial hygiene - no eating, smoking or drinking.

MSDS # 18081

DON'T SAY IT --- *Write It!*

DATE 6-27-90

TO Files FROM Gayle

Via Co: This MSDS covers the Radiacwash spray mist, Radiacwash Towlettes, Same product just different form as Radiacwash Liquid

"TO MAKE LIFE LAST, PUT SAFETY FIRST"

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MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1495
SODIUM NITRITE

MANUFACTURER INFORMATION

Product Trade Name: SODIUM NITRITE
MSDS Date: 05/01/89

J. T. Baker
222 Red School Lane
Phillipsburg, NJ 08865
(800) JTBAKER
(800) 582-2537

EFFECTIVE: 05/01/89
ISSUED: 02/07/92

EMERGENCY Phone: (908) 859-2151 24 Hour
(800) 424-9300 CHEMTREC
(800) 424-8802 National Response Center

SECTION I - MATERIAL IDENTIFICATION

Mfg's Product ID: 3780,3782

CAS Number: 7632-00-0

Formula: NANO2

NIOSH RTECS Number: RA1225000

Chemical Family: INORGANIC SODIUM COMPOUNDS

OTHER DESIGNATIONS (Synonyms) --------
SODIUM NITRITE
NITROUS ACID,SODIUM SALT
ANTI-RUST

Unidentified Numbers on MSDS: S4466 M03

Additional Information: BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 2 MODERATE
FLAMMABILITY - 0 NONE
REACTIVITY - 3 SEVERE (OXIDIZER)
CONTACT - 2 MODERATE

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1495
SODIUM NITRITE

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Ingredient Name	*CAS Number*	*Percent*	*Exposure Limits*
SODIUM NITRITE	*7632-00-0*	*97-100*	*PEL: NOT ESTABLISHED* *TLV: NOT ESTABLISHED*

PRODUCT Exposure Limits: THRESHOLD LIMIT VALUE (TLV/TWA): NOT ESTABLISHED

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): NOT ESTABLISHED

SECTION III - PHYSICAL DATA

Appearance and Odor: WHITE TO YELLOW GREEN OR PURPLE ODORLESS.
Product Uses: LABORATORY REAGENT

Boiling Point: 320 C (608 F) (AT 760 MMHG)
Vapor Pressure: NOT APPLICABLE OR NOT AVAILABLE
Vapor Density: 2.4 (AIR=1)
Water Solubility: APPRECIABLE (>10%)
pH: NOT APPLICABLE OR NOT AVAILABLE
Odor Threshold: NOT APPLICABLE OR NOT AVAILABLE
Specific Gravity: 2.17 (H2O=1)
Melting Point: 271 C (519 F) (AT 760 MMHG)
Evaporation Rate: NOT APPLICABLE OR NOT AVAILABLE
Percent Volatile: 0 (21 C) BY VOLUME
Molecular Weight: 69.00
Physical State: SOLID
Oil/Water Coeff.: NOT APPLICABLE OR NOT AVAILABLE

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1495
SODIUM NITRITE

SECTION IV - FIRE AND EXPLOSION DATA

Flammable Limits:

LEL(%): NOT APPLICABLE OR NOT AVAILABLE
UEL(%): NOT APPLICABLE OR NOT AVAILABLE

Autoignition: NOT APPLICABLE OR NOT AVAILABLE

Flash Point (Method): NOT APPLICABLE OR NOT AVAILABLE

Extinguishing Media: USE WATER SPRAY.

Special Fire Fighting Procedures: FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

Unusual Fire and Explosion Hazards: STRONG OXIDIZER. CONTACT WITH COMBUSTIBLE MATERIALS, FLAMMABLE MATERIALS, OR POWDERED METALS CAN CAUSE FIRE OR EXPLOSION. CAN REACT VIOLENTLY WITH SHOCK, FRICTION OR HEAT.

Harmful Combustion Products: TOXIC GASES PRODUCED: OXIDES OF NITROGEN

Sensitivity to Impact: NONE IDENTIFIED.

Sensitivity to Static Discharge: NONE IDENTIFIED.

SECTION V - REACTIVITY DATA

Stability: STABLE

Hazardous Polymerization: WILL NOT OCCUR

CONDITIONS TO AVOID: SHOCK, FRICTION, HEAT

Incompatabilities/Materials to Avoid: CYANIDES, STRONG ACIDS, STRONG REDUCING AGENTS, COMBUSTIBLE MATERIALS, ORGANIC MATERIALS, AMMONIUM SALTS

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1495
SODIUM NITRITE

--- SECTION V - REACTIVITY DATA continued from page 3 ---

Hazardous Decomposition Products: OXIDES OF NITROGEN

SECTION VI - HEALTH HAZARDS

Effects of Exposure/Overexposure:
INHALATION: IRRITATION OF UPPER RESPIRATORY TRACT

SKIN CONTACT: IRRITATION

EYE CONTACT: IRRITATION

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: IRRITATION AND BURNS TO MOUTH AND STOMACH, INGESTION OF LARGE QUANTITIES MAY CAUSE NAUSEA, VOMITING, CYANOSIS, CONVULSIONS, LOW BLOOD PRESSURE

Chronic: NONE IDENTIFIED

Medical Conditions Aggravated: NONE IDENTIFIED

Routes of Entry: INHALATION, INGESTION, SKIN CONTACT, EYE CONTACT

Target Organs: BLOOD

Cancer Statement: CARCINOGENICITY:
NTP: NO
IARC: NO
Z LIST: NO
OSHA REG: NO

CARCINOGENICITY: NITROSAMINE FORMATION MAY OCCUR WHEN SODIUM NITRITE COMES IN CONTACT WITH VARIOUS SECONDARY AND TERTIARY AMINES. NITROSAMINES ARE POTENTIALLY CARCINOGENIC COMPOUNDS.

Toxicity Data: TOXICITY OF COMPONENTS
ORAL RAT LD50 FOR SODIUM NITRITE ... 85 MG/KG
INTRAPERITONEAL MOUSE LD50 FOR SODIUM NITRITE ... 158 MG/KG
INTRAVENOUS RAT LD50 FOR SODIUM NITRITE ... 65 MG/KG

REPRODUCTIVE EFFECTS: NONE IDENTIFIED.

MATERIAL SAFETY DATA SHEET

J. T. Baker *Hanford's MSDS No.: 1495*
SODIUM NITRITE

SECTION VII - FIRST AID PROCEDURES

Eyes: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

Skin: IN CASE OF CONTACT, FLUSH SKIN WITH WATER.

Inhalation: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

Ingestion: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. INDUCE VOMITING.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: SAF-T-DATA (TM) STORAGE COLOR CODE: YELLOW (REACTIVE)

KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE AND COMBUSTIBLE MATERIALS.

Other Precautions: SPECIAL PRECAUTIONS MATERIAL IS HYGROSCOPIC.

Personal Protection ----------

Respirator: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

Eye Protection: SAFETY GOGGLES ARE RECOMMENDED.

Gloves: BUTYL RUBBER GLOVES ARE RECOMMENDED.

Other Protective Clothing & Equipment: SKIN PROTECTION: UNIFORM IS RECOMMENDED.

WORKPLACE CONTROLS ----------

Ventilation: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1495
SODIUM NITRITE

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

Waste Management/Disposal: DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

RCRA: EPA HAZARDOUS WASTE NUMBER: D001, D003 (IGNITABLE, REACTIVE WASTE)

SARA Title III / CERCLA: ACUTE: YES
CHRONIC: YES
FLAMMABILITY: YES
PRESSURE: NO
REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS SODIUM NITRITE (RQ = 100 LBS)

SARA 313 TOXIC CHEMICALS: NO

UN No: D.O.T. UN: UN1500

INTERNATIONAL (I.M.O.) UN:
UN1500

AIR (I.C.A.O.) UN: UN1500

DOT Hazard Class: OXIDIZER
DOT Shipping Name: SODIUM NITRITE
DOT Labels/Placards: OXIDIZER

Other Hazard Class: INTERNATIONAL (I.M.O.): 5.1

AIR (I.C.A.O.): 5.1
Other Shipping Name: INTERNATIONAL (I.M.O.): SODIUM NITRITE

AIR (I.C.A.O.): SODIUM NITRITE
Other Labels/Placards:
INTERNATIONAL (I.M.O.) LABELS: OXIDIZING AGENT

AIR (I.C.A.O.) LABELS: OXIDIZING

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1495
SODIUM NITRITE

--- SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING continued from page 6 ---

AGENT

Special Shipping: REPORTABLE QUANTITY: 100 LBS.

U.S. CUSTOMS HARMONIZATION NUMBER: 28341000006

Additional Information: D.O.T. REGULATORY REFERENCES: 49CFR 172.101; 173.234

INTERNATIONAL (I.M.O.) I.M.O. PAGE: 5077

INTERNATIONAL (I.M.O.) PACKAGING GROUP: III

INTERNATIONAL (I.M.O.) MARINE POLLUTANTS: NO

INTERNATIONAL (I.M.O.) REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.) PACKAGING GROUP: III

AIR (I.C.A.O.) REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 172.3== SEE SHIPPER REQUIREMENTS 49 CFR 172.3 AND EMPLOYEE TRAINING 49 CFR 173.1.

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

LABELS: PRECAUTIONARY LABELING

BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 2 MODERATE
FLAMMABILITY - 0 NONE
REACTIVITY - 3 SEVERE (OXIDIZER)
CONTACT - 2 MODERATE

LABORATORY PROTECTIVE EQUIPMENT: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1495
SODIUM NITRITE

--- SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS continued from page 7 ---

U.S. PRECAUTIONARY LABELING:

DANGER CAUSES IRRITATION. HARMFUL IF INHALED. MAY BE FATAL IF SWALLOWED. STRONG OXIDIZER. CONTACT WITH COMBUSTIBLE MATERIALS, FLAMMABLE MATERIALS, OR POWDERED METALS CAN CAUSE FIRE OR EXPLOSION. KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS. DO NOT STORE NEAR COMBUSTIBLE MATERIALS. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, SOAK WITH WATER. IN CASE OF SPILL, SWEEP UP AND REMOVE. FLUSH SPILL AREA WITH WATER.

INTERNATIONAL LABELING:

CONTACT WITH COMBUSTIBLE MATERIAL MAY CAUSE FIRE. TOXIC IF SWALLOWED. IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW THE LABEL WHERE POSSIBLE)

SAF-T-DATA (TM) STORAGE COLOR CODE: YELLOW (REACTIVE)

Additional MSDS Information: COPYRIGHT 1992 J T BAKER INC.

(TM) TRADEMARKS OF J T BAKER INC.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

Regulatory Information ----------

TSCA: TSCA INVENTORY: YES

Manufacturer's Disclaimer: THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1495
SODIUM NITRITE

MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE. THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

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MSDS # 13294

MATERIAL SAFETY DATA SHEET

NPCA #1

FOR COATINGS, RESINS AND RELATED MATERIALS

(Approved by U.S. Department of Labor. Essentially Similar to Form OSHA-20)

Section I

MANUFACTURER'S NAME	Sprayon Products, Inc.	EMERGENCY TELEPHONE NO	216/292-7400
STREET ADDRESS	26300 Fargo Avenue		
CITY, STATE, AND ZIP CODE	Bedford Hts., OH 44146		
PRODUCT CLASS (Aerosol)	Coating	CODE IDENTIFICATION	No. 322
		DATE	3/15/76
TRADE NAME	Strippable Protective Coating	Lab No.	33768

Section II — HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	TLV PPM	TLV mg/M³	LEL	VAPOR PRESSURE
Toluene	20	100		1.2	
Methyl Ethyl Ketone	10	200		1.8	
Acetone	15	1000		2.6	
Propellant:					
Dichlorodifluoromethane(Freon 12)	40	1000		none	
Aerosol- Contents Under Pressure					40 ± 5 ps

Section III — PHYSICAL DATA

BOILING RANGE: Propellant below 0°F.

VAPOR DENSITY: [X] HEAVIER [ ] LIGHTER THAN AIR

EVAPORATION RATE: [=] FASTER [ ] SLOWER, THAN ETHER

Propellants

PERCENT VOLATILE BY VOLUME: 90

WEIGHT PER GALLON: n. a.

Section IV — FIRE AND EXPLOSION HAZARD DATA

DOT CATEGORY: Consumer Commodity ORM-D-AIR

FLASH POINT: Above 20°F. Below 80°F. (See Section)

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical or foam

UNUSUAL FIRE AND EXPLOSION HAZARDS: Do not spray near open flame. Keep at room temperature as exposure to direct sunlight or other heat may cause bursting.

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective [illegible] used to keep fire exposed containers cool.

Section V — HEALTH HAZARD DATA MSDS # 15274

THRESHOLD LIMIT VALUE	See Section II Hazardous Ingredients
EFFECTS OF OVEREXPOSURE	Light-headedness, giddiness, shortness of breath and possible nausea.
EMERGENCY AND FIRST AID PROCEDURES	Remove to fresh air - call physician. If sprayed in eye, flush thoroughly with water - call physician.

Section VI — REACTIVITY DATA

STABILITY ☐ UNSTABLE ☒ STABLE

CONDITIONS TO AVOID Do not store above 120°F.

INCOMPATABILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS By open flame: Fumes may contain carbon monoxide and toxic fumes of chlorides and fluorides.

HAZARDOUS POLYMERIZATION ☐ MAY OCCUR ☒ WILL NOT OCCUR

CONDITIONS TO AVOID

Section VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Remove all sources of ignition, ventilate Avoid breathing of vapors and remove with inert absorbent
WASTE DISPOSAL METHOD	Do not incinerate - Dispose in accordance with federal, state and local regulations regarding pollution.

Section VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION	Avoid breathing of vapor or spray mist
VENTILATION	Provide local exhaust ventilation in volume and pattern to keep TLV of most hazardous ingredients in Section II below acceptable limit, and LEL in Section IV below stated limit.
PROTECTIVE GLOVES	
EYE PROTECTION	
OTHER PROTECTIVE EQUIPMENT	

Section IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Do not store above 120°F. Keep at room temperature as exposure to direct sunlight or other heat may cause bursting
OTHER PRECAUTIONS	Do not puncture or incinerate. Do not spray near fire or open flame. Keep away from children.

Section V — HEALTH HAZARD DATA MSDS # 13294

THRESHOLD LIMIT VALUE: See Section II Hazardous Ingredients

EFFECTS OF OVEREXPOSURE: Light-headedness, giddiness, shortness of breath and possible nausea.

EMERGENCY AND FIRST AID PROCEDURES: Remove to fresh air - call physician. If sprayed in eye, flush thoroughly with water - call physician.

Section VI — REACTIVITY DATA

STABILITY ☐ UNSTABLE ☒ STABLE

CONDITIONS TO AVOID: Do not store above 120°F.

INCOMPATABILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS: By open flame: Fumes may contain carbon monoxide and toxic fumes of chlorides and fluorides.

HAZARDOUS POLYMERIZATION ☐ MAY OCCUR ☒ WILL NOT OCCUR

CONDITIONS TO AVOID

Section VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition, ventilate Avoid breathing of vapors and remove with inert absorbent

WASTE DISPOSAL METHOD: Do not incinerate - Dispose in accordance with federal, state and local regulations regarding pollution.

Section VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Avoid breathing of vapor or spray mist

VENTILATION: Provide local exhaust ventilation in volume and pattern to keep TLV of most hazardous ingredients in Section II below acceptable limit, and LEL in Section IV below stated limit.

PROTECTIVE GLOVES

EYE PROTECTION

OTHER PROTECTIVE EQUIPMENT

Section IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Do not store above 120°F. Keep at room temperature as exposure to direct sunlight or other heat may cause burstin

OTHER PRECAUTIONS: Do not puncture or incinerate. Do not spray near fire or open flame. Keep away from children.

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MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1509
SODIUM PHOSPHATE, TRIBASIC, 12-HYDRATE

MANUFACTURER INFORMATION

Product Trade Name: SODIUM PHOSPHATE, TRIBASIC, 12-HYDRATE
MSDS Date: 05/01/89

J. T. Baker
222 Red School Lane
Phillipsburg, NJ 08865
(800) JTBAKER
(800) 582-2537

EFFECTIVE: 05/01/89
ISSUED: 02/07/92

EMERGENCY Phone: (908) 859-2151 24 Hour
(800) 424-9300 CHEMTREC
(800) 424-8802 National Response Center

SECTION I - MATERIAL IDENTIFICATION

Mfg's Product ID: 3836,5349,3840,3837

CAS Number: 10101-89-0

Formula: NA3PO4 12H2O

NIOSH RTECS Number: TC9575000

Chemical Family: INORGANIC SODIUM COMPOUNDS

OTHER DESIGNATIONS (Synonyms) --------
SODIUM PHOSPHATE, TRIBASIC, 12-HYDRATE
TRISODIUM PHOSPHATE, 12-HYDRATE
PHOSPHORIC ACID, TRISODIUM SALT, 12-HYDRATE

Unidentified Numbers on MSDS: S4770 M04

Additional Information: BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 2 MODERATE
FLAMMABILITY - 0 NONE
REACTIVITY - 1 SLIGHT
CONTACT - 2 MODERATE

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1509
SODIUM PHOSPHATE, TRIBASIC, 12-HYDRATE

SECTION II - INGREDIENTS AND EXPOSURE LIMITS

Ingredient Name	*CAS Number*	*Percent*	*Exposure Limits*
SODIUM PHOSPHATE, TRIBASIC	*10101-89-0*	*98-100*	*PEL: NOT ESTABLISHED* *TLV: NOT ESTABLISHED*

PRODUCT Exposure Limits: THRESHOLD LIMIT VALUE (TLV/TWA): NOT ESTABLISHED

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): NOT ESTABLISHED

SECTION III - PHYSICAL DATA

Appearance and Odor: WHITE CRYSTALLINE SOLID. ODORLESS.
Product Uses: LABORATORY REAGENT

Boiling Point: NOT APPLICABLE OR NOT AVAILABLE
Vapor Pressure: NOT APPLICABLE OR NOT AVAILABLE
Vapor Density: NOT APPLICABLE OR NOT AVAILABLE
Water Solubility: APPRECIABLE (>10%)
pH: NOT APPLICABLE OR NOT AVAILABLE
Odor Threshold: NOT APPLICABLE OR NOT AVAILABLE
Specific Gravity: 1.62 (H2O=1)
Melting Point: NOT APPLICABLE OR NOT AVAILABLE
Evaporation Rate: NOT APPLICABLE OR NOT AVAILABLE
Percent Volatile: 0 (21 C) BY VOLUME
Molecular Weight: 380.12
Physical State: SOLID
Oil/Water Coeff.: NOT APPLICABLE OR NOT AVAILABLE

SECTION IV - FIRE AND EXPLOSION DATA

Flammable Limits:

LEL(%): NOT APPLICABLE OR NOT AVAILABLE
UEL(%): NOT APPLICABLE OR NOT AVAILABLE

Autoignition: NOT APPLICABLE OR NOT AVAILABLE

Flash Point (Method): NOT APPLICABLE OR NOT AVAILABLE

Extinguishing Media: USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

Special Fire Fighting Procedures: FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

Unusual Fire and Explosion Hazards: CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE.

Harmful Combustion Products: TOXIC GASES PRODUCED: OXIDES OF PHOSPHORUS

Sensitivity to Impact: NONE IDENTIFIED.

Sensitivity to Static Discharge: NONE IDENTIFIED.

SECTION V - REACTIVITY DATA

Stability: STABLE

Hazardous Polymerization: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

Incompatabilities/Materials to Avoid: STRONG ACIDS, IRON AND OTHER HEAVY METALS

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1509
SODIUM PHOSPHATE, TRIBASIC, 12-HYDRATE

--- SECTION V - REACTIVITY DATA continued from page 3 ---

Hazardous Decomposition Products: OXIDES OF PHOSPHORUS

SECTION VI - HEALTH HAZARDS

Effects of Exposure/Overexposure:
INHALATION: IRRITATION OF UPPER RESPIRATORY TRACT

SKIN CONTACT: SEVERE IRRITATION OR BURNS

EYE CONTACT: SEVERE IRRITATION OR BURNS

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NAUSEA, VOMITING, DIARRHEA, IRRITATION AND BURNS TO MOUTH AND STOMACH

Chronic: NONE IDENTIFIED

Medical Conditions Aggravated: NONE IDENTIFIED

Routes of Entry: INGESTION, INHALATION, EYE CONTACT, SKIN CONTACT

Target Organs: EYES, SKIN

Cancer Statement: CARCINOGENICITY:
NTP: NO
IARC: NO
Z LIST: NO
OSHA REG: NO

CARCINOGENICITY: NONE IDENTIFIED.

Toxicity Data: TOXICITY OF COMPONENTS
ORAL RAT LD50 FOR SODIUM PHOSPHATE, TRIBASIC ... 7400 MG/KG
INTRAPERITONEAL MOUSE LD50 FOR SODIUM PHOSPHATE, TRIBASIC ... 430 MG/KG

REPRODUCTIVE EFFECTS: NONE IDENTIFIED.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1509
SODIUM PHOSPHATE, TRIBASIC, 12-HYDRATE

SECTION VII - FIRST AID PROCEDURES

Eyes: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

Skin: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

Inhalation: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

Ingestion: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. INDUCE VOMITING.

SECTION VIII - WORKPLACE PRECAUTIONS / CONTROL MEASURES

Handling/Storage Precautions: SAF-T-DATA (TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

Personal Protection ----------

Respirator: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.

Eye Protection: SAFETY GOGGLES ARE RECOMMENDED.

Gloves: RUBBER GLOVES ARE RECOMMENDED.

Other Protective Clothing & Equipment: SKIN PROTECTION: UNIFORM IS RECOMMENDED.

WORKPLACE CONTROLS ----------

Ventilation: USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1509
SODIUM PHOSPHATE, TRIBASIC, 12-HYDRATE

SECTION IX - SPILL & LEAK / ENVIRONMENT / SHIPPING

SPILL & LEAK / ENVIRONMENTAL ----------

Procedures for Spill / Leak: WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

Waste Management/Disposal: DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

SARA Title III / CERCLA: ACUTE: YES
CHRONIC: NO
FLAMMABILITY: NO
PRESSURE: NO
REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS SODIUM PHOSPHATE, TRIBASIC (RQ = 5000 LBS)

SARA 313 TOXIC CHEMICALS: NO

NA Number: NA9188

DOT Hazard Class: ORM-E
DOT Shipping Name: HAZARDOUS SUBSTANCE, SOLID, N.O.S. (SODIUM PHOSPHATE, TRIBASIC)
DOT Labels/Placards: NONE

Other Shipping Name: INTERNATIONAL (I.M.O.): CHEMICALS, N.O.S. (NON-REGULATED)

AIR (I.C.A.O.): CHEMICALS, N.O.S. (NON-REGULATED)

Special Shipping: REPORTABLE QUANTITY: 5000 LBS.

U.S. CUSTOMS HARMONIZATION NUMBER: 28352300000

Additional Information: D.O.T. REGULATORY REFERENCES: 49CFR 172.101; 173.500; 173.510

INTERNATIONAL (I.M.O.) MARINE POLLUTANTS: NO

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 1509
SODIUM PHOSPHATE, TRIBASIC, 12-HYDRATE

SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS

LABELS: PRECAUTIONARY LABELING

BAKER SAF-T-DATA (TM) SYSTEM
HEALTH - 2 MODERATE
FLAMMABILITY - 0 NONE
REACTIVITY - 1 SLIGHT
CONTACT - 2 MODERATE

LABORATORY PROTECTIVE EQUIPMENT: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING:

WARNING: CAUSES IRRITATION. HARMFUL IF SWALLOWED OR INHALED. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

INTERNATIONAL LABELING:

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

SAF-T-DATA (TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

Additional MSDS Information: COPYRIGHT 1992 J T BAKER INC.

(TM) TRADEMARKS OF J T BAKER INC.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

Regulatory Information ----------

TSCA: TSCA INVENTORY: YES

Manufacturer's Disclaimer: THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER

MATERIAL SAFETY DATA SHEET

J. T. Baker

Hanford's MSDS No.: 150?
SODIUM PHOSPHATE, TRIBASIC, 12-HYDRATE

--- SECTION X - LABELS / SUPPLEMENTAL / OTHER REGS continued from page 7 ---

IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE. THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

TURCO PRODUCTS, INC.
MATERIAL SAFETY DATA SHEET

PENNWALT

00954
4572-18

SECTION I — PRODUCT NAME: Turco W.O. #2

Manufacturer's Name: TURCO PRODUCTS, INC.
Address: 7300 Bolsa Ave., Westminster, CA 92684-3600
Emergency Telephone No.: (614) 287-4000 Info. Tel. No. (714) 890-3600

MSDS #20424

SECTION II — HAZARDOUS INFORMATION:

COMPONENTS	C.A.S. NUMBER	CERCLA RQ SPILL lbs.	RCRA WASTE No.	ACGIH TLV	OSHA TWA	% WT.
Phosphoric acid *	7664-38-2	5000	D002	1 mg/m³	1 mg/m³	75
The following non-hazardous ingredient is listed in accordance with the Worker and Community Right-to-Know Act of certain states, including Pennsylvania and New Jersey: Water(7732-18-5)						

asterisk are subject to SARA Section 313 reporting.

CARCINOGENS (AS DEFINED IN 29CFR 1910.1200)	NTP	IARC	OSHA
Contains no components defined to be carcinogens	Not listed	Not listed	Not regulated

PROPER SHIPPING NAME	HAZARD CLASS	HAZARD I.D. NO.
Compound, cleaning liquid	Corrosive material	NA 1760

SECTION III — PHYSICAL DATA:

BOILING POINT, °F: 212°F	SPECIFIC GRAVITY: 1.56
VAPOR PRESSURE (mmHg): Approx. 10mmHg	VOLATILE % BY VOL.: 55
VAPOR DENSITY (AIR = 1): more than 1	EVAPORATION RATE (Bu.Ac. = 1): Less than 1
APPEARANCE AND ODOR: Clear, colorless liquid; mild odor	SOLUBILITY IN WATER: Complete; pH 1:1 in H₂O: 3-4

SECTION IV — FIRE AND EXPLOSION HAZARDS:

FLASH POINT AND METHOD USED:
Not applicable - Nonflammable

EXTINGUISHING MEDIA:
Not applicable

SPECIAL FIRE FIGHTING PROCEDURE AND PRECAUTIONS:
Use self-contained respiratory protection.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
None

SECTION V — HEALTH, EMERGENCY AND FIRST AID INFORMATION:

EFFECTS OF OVER EXPOSURE: EYES:
Severe irritation, possible chemical burns, possible tissue damage or destruction, possible blindness.

SKIN:
Severe irritation, possible chemical burns, possible tissue damage.

INHALATION:
Mist: Severe irritation, may cause damage to upper respiratory tract.

INGESTION:
Severe irritation, possible damage to gastrointestinal tract.

MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED:
None known

N-14GA

NO: [illegible]

FIRST AID: EYES: Speed is essential. Immediately begin flushing eyes with large volumes of water. Continue for at least 15 minutes. Hold lids apart to ensure contact with all surfaces. Obtain medical attention.

SKIN: Flush affected area with large volumes of water. Wash with soap and water. Rinse thoroughly. If irritation is evident or blistering occurs, obtain medical attention.

INHALATION: Remove to fresh air. Administer oxygen if breathing is difficult. Obtain medical attention if irritation persists.

INGESTION: Do not induce vomiting except on advice of qualified medical personnel. If victim is conscious, dilute by giving large volumes of milk or water. Obtain immediate medical attention. Never attempt to induce vomiting or give anything by mouth to an unconscious person.

PRIMARY ROUTES OF ENTRY: INHALATION X SKIN CONTACT X OTHER ____

SECTION VI — REACTIVITY DATA:

STABILITY: STABLE X UNSTABLE ____ HAZARDOUS POLYMERIZATION WILL NOT OCCUR

CONDITIONS TO AVOID: Contact with strong alkalis, reactive metals

MSDS #[illegible]

HAZARDOUS DECOMPOSITION PRODUCTS: None

SECTION VII — SPILL, LEAK AND DISPOSAL PROCEDURE:

SPILL OR RELEASE PROCEDURE: CONCENTRATE: Confine spill. Stop leak at source if this can be done safely. Ventilate area. Evacuate nonessential personnel. Pump liquid into DOT-approved drums for disposal. Absorb remaining liquid onto inert absorbent and place in DOT-approved drums for disposal. Wash area with water. Collect washings and place in DOT-approved drums. Keep spill and washings from entering sewer or waterways.

USE SOLUTION: As for concentrate

DISPOSAL INFORMATION: CONCENTRATE: (1) Transfer to reclaiming center for recycling or reuse, if possible. (2) Transfer to licensed waste treatment or disposal site for disposition under applicable local, state and regional regulations.

SPENT SOLUTION AND RINSES: Dispose per (1) or (2) above, or phosphates (and fluorides, if present) may be removed by lime treatment; heavy metals (if present) precipitated by pH adjustment to 7.5 - 10.5; the pH of the separated water should then be readjusted to pH 7.5 - 8.5. The clarified water may be released to sewer if local regulations permit.

SECTION VIII — SPECIAL PROTECTION INFORMATION:

RESPIRATORY PROTECTION: For mist conditions, a NIOSH-approved respirator for mists is advised. If respirators are used, a formal training and screening program must be initiated. See 29 CFR 1910-134.

VENTILATION: Maintain sufficient mechanical ventilation to keep particulate concentration below TLV

PROTECTIVE EQUIPMENT: CHEMICAL FACE SHIELD OR GOGGLE X **GLOVES** X **BOOTS** X **APRON** X **PROTECTIVE SUIT** Not normally required

GLOVES, BOOTS, APRON AND SUIT MADE FROM: Acid resistant material (e.g. Neoprene)

RECOMMENDED PERSONAL HYGIENE: Wash hands and face with soap and water before smoking or eating. Immediately remove contaminated clothing. Launder before reuse. Do not launder at home. Discard contaminated shoes.

SECTION IX — OTHER INFORMATION:

SPECIAL PRECAUTIONS — STORAGE AND HANDLING:

Store in dry protected area.

MIXING:

Add slowly to water while mixing. Make additions to in-use tanks slowly and cautiously.

REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT: Relieve pressure. Cover openings to avoid spurting. Flush exterior and interior with water. Collect flushings for disposal. Use appropriate protective equipment for eyes, skin and inhalation.

DATE PREPARED: **DATE REVIEWED:**
APPROVED: [illegible] 6/88 **Q.C. DEPT./** [signature] **R & D DEPT./** [initials] **SAFETY & DIVISION** [signature]

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TURCO PRODUCTS
MATERIAL SAFETY DATA SHEET

HAZARD RATING	
4 = EXTREME	FIRE
3 = HIGH	REACTIVITY
2 = MODERATE	HEALTH
1 = SLIGHT	SPECIAL
0 = INSIGNIFICANT	
* = CHRONIC HEALTH HAZARD — SEE SECTION V	

SECTION I — PRODUCT NAME: Turco Decon 4502

ISSUE DATE: [illegible]

Manufacturer's Name:	TURCO PRODUCTS, INC.
Address:	7300 Bolsa Ave., Westminster, CA 92684-3600
Emergency Telephone No.:	(614)387-4200 Info. Tel. No. (714)890-3600

MSDS # 21977

SECTION II — HAZARDOUS INFORMATION:

COMPONENTS	C.A.S. NUMBER	CERCLA RQ SPILL #	RCRA WASTE #	ACGIH TLV	OSHA TWA	% WT.
Sulfamic Acid*	5329146	Not Listed	Not Listed	Not Estab	Not Estab	30
Sodium Bisulfate *	7681381	Not Listed	Not Listed	Not Estab	Not Estab	15

THIS PRODUCT CONTAINS NO CHEMICALS SUBJECT TO SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT OF 1986 (SARA).

*Listed because of irritation properties only

CARCINOGENS	NTP	IARC	OSHA
None	N. Apl.	N. Apl.	N. Apl.

PROPER SHIPPING NAME:	HAZARD CLASS	HAZARD I.D. NO.
Corrosive Solid NOS	Corrosive	UN 1759

SECTION III — PHYSICAL DATA:

BOILING POINT, °F	Not applicable	SPECIFIC GRAVITY	Not applicable
VAPOR PRESSURE mmHg	Not applicable	VOLATILE % BY VOL.	Not applicable
VAPOR DENSITY (AIR = 1)	Not applicable	EVAPORATION RATE (Bu. Ac. = 1)	Not applicable
APPEARANCE AND ODOR:	Off-white granular powder	SOLUBILITY IN WATER:	Appreciable
		pH of 1% soln:	1

SECTION IV — FIRE AND EXPLOSION HAZARDS:

FLASH POINT AND METHOD USED:
Nonflammable - Not applicable

EXTINGUISHING MEDIA:
Not applicable

SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS:
Use self contained respiratory protection.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Contact with water and reactive metals, such as aluminum, zinc, tin, etc., may lead to generation of hydrogen gas in explosive amounts.

SECTION V — EMERGENCY, FIRST AID AND HEALTH INFORMATION:

EFFECTS OF OVEREXPOSURE EYES: Contact with product, product dust or product solution will cause severe burns; possible permanent tissue damage and possible blindness.

SKIN: Contact with product, product dust or product solution will cause severe irritation, possible chemical burns and possible permanent tissue damage.

INHALATION: Inhalation of dust or mist will cause severe irritation and possible permanent damage to upper respiratory tract.

INGESTION: Severe irritation, possible permanent damage to gastrointestinal tract.

MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED:
None known

MSDS #21977

EYES: Speed is essential. Immediately begin flushing eyes with large volumes of water. Continue for at least 15 minutes. Hold lids apart to assure contact with all surfaces. Obtain medical attention.

SKIN: Flush affected area with large volumes of water. If irritation is evident or blistering occurs, obtain medical attention.

INHALATION: Remove to fresh air. Administer oxygen if breathing is difficult. Obtain medical attention if irritation persists.

INGESTION: Do not induce vomiting. If victim is conscious, dilute by giving large volumes of milk or water. Obtain immediate medical attention. Never attempt to give anything by mouth to an unconscious person.

PRIMARY ROUTES OF ENTRY: INHALATION X SKIN CONTACT X OTHER

SECTION VI — REACTIVITY DATA:

STABILITY: STABLE X UNSTABLE HAZARDOUS POLYMERIZATION WILL NOT OCCUR

CONDITIONS TO AVOID:

Contact with strong alkalies, reactive metals, organic materials

HAZARDOUS DECOMPOSITION PRODUCTS:

None

SECTION VII — SPILL, LEAK AND DISPOSAL PROCEDURE:

SPILL OR RELEASE PROCEDURE: CONCENTRATE: Evacuate personnel. Should use appropriate protective equipment. Shovel dry spill into DOT-approved drums for disposal. Keep spill dry until as much as possible has been swept up and shoveled into disposal drums. Residual amounts should be dissolved in water and solution collected in DOT-approved drums for disposal. Area may be neutralized with soda ash solution. Do not allow product or rinse water from spill to enter sewer or waterways.

USE SOLUTION: Confine spill. Stop leak at source if this can be done safely. Ventilate area. Evacuate nonessential personnel. Pump liquid into DOT-approved drums for disposal. Absorb remaining liquid onto inert absorbent and place in DOT-approved drums for disposal. Wash area with water and neutralize with soda ash solution. Collect washings and place in DOT-approved drums. Keep spill and washings from entering sewer or waterways.

DISPOSAL INFORMATION: CONCENTRATE: (1) Transfer to reclaiming center for recycling or reuse, if possible. (2) Transfer to licensed hazardous waste treatment or disposal site for disposition under applicable local, state and regional regulations as hazardous waste.

SPENT SOLUTION AND RINSES: Dispose as (1) or (2) above, as heavy metals may be precipitated by pH adjustment to 9.5-10.5. The pH of the separated water should then be readjusted to pH 7.5-8.5. Any residual organic matter may be removed by oxidation and/or carbon treatment. Clarified water may be released to sewer if local regulations permit.

SECTION VIII — SPECIAL PROTECTION INFORMATION:

RESPIRATORY PROTECTION: For dust or mist conditions, a NIOSH-approved respirator for dust and mists is advised. If respirators are used, a formal training and screening program must be initiated. See 29 CFR 1910-134.

VENTILATION: Maintain sufficient mechanical ventilation to keep particulate concentration below TLV.

PROTECTIVE EQUIPMENT: CHEMICAL FACE SHIELD OR GOGGLES X

GLOVES X BOOTS X APRON X PROTECTIVE SUIT Not normally required

GLOVES, BOOTS, APRON AND SUIT MADE FROM: Acid resistant neoprene

RECOMMENDED PERSONAL HYGIENE: Wash hands and face with soap and water before smoking or eating. Immediately remove all contaminated clothing. Launder before reuse. Do not launder at home. Discard contaminated shoes.

SECTION IX — OTHER INFORMATION:

SPECIAL PRECAUTIONS — STORAGE AND HANDLING: Store in dry protected area.

OTHER: Add slowly to rapid water while mixing. Never dump large amounts into water. Add only as fast as product dissolves. Make additions to in-use tank slowly and cautiously to avoid splashing. Pre-dissolve in water.

REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT: Relieve any pressure. Cover openings to avoid splashing. Clean exterior and interior by flushing with water. Collect flushings for disposal. Use protective equipment for eyes, skin and inhalation.

DATE PREPARED: JB 1/89 DATE REVISED:

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4306-11 MSDS #2556

TURCO PRODUCTS
MATERIAL SAFETY DATA SHEET

HAZARD RATING: 4 = EXTREME, 3 = HIGH, 2 = MODERATE, 1 = SLIGHT, 0 = INSIGNIFICANT, * = CHRONIC HEALTH HAZARD — SEE SECTION V

Fire: 1; Toxicity: 3; Reactivity: 2; Special

ISSUE DATE: 11/22/85

SECTION I — PRODUCT NAME: Turco Decon 4306D *

Manufacturer's Name:	TURCO PRODUCTS, INC.	(714) 890-3600
Address:	7300 BOLSA AVENUE WESTMINISTER, CALIF. 92684-3600	EMERGENCY # (614)387-6200

SECTION II — HAZARDOUS INFORMATION:

COMPONENTS	C.A.S. Number	CERCLA RQ SPILL #	RCRA Waste #	ACGIH TLV	OSHA TWA	%, WT.
*Sulfamic Acid	5329146	NtLstd	NtLstd	Nt Estab	Nt Estab	50
*Sodium bisulfate	7681381	NtLstd	NtLstd	Nt Estab	Nt Estab	45
*listed because of irritation properties only						

CARCINOGENS	NTP	IARC	OSHA
None	N. Apl.	N. Apl.	N. Apl.

PROPER SHIPPING NAME:	HAZARD CLASS	HAZARD I.D. No.
Corrosive Solid NOS	Corrosive	UN 1759

SECTION III — PHYSICAL DATA:

BOILING POINT, °F:	Not applicable	SPECIFIC GRAVITY:	Not applicable
VAPOR PRESSURE (mmHg):	Not applicable	VOLATILE, % BY VOL:	Not applicable
VAPOR DENSITY (AIR = 1):	Not applicable	EVAPORATION RATE (Bu. Ac. = 1):	Not applicable
APPEARANCE AND ODOR:	Off-white granular powder	SOLUBILITY IN WATER:	Appreciable; pH of 3% Soln: 1

SECTION IV — FIRE AND EXPLOSION HAZARDS:

FLASH POINT AND METHOD USED: Nonflammable - Not applicable

EXTINGUISHING MEDIA: Not applicable

SPECIAL FIRE FIGHTING PROCEDURE AND PRECAUTIONS: Use self contained respiratory protection.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Contact with water and reactive metals, such as aluminum, zinc, tin, etc., may lead to generation of hydrogen gas in explosive amounts.

SECTION V — EMERGENCY, FIRST AID AND HEALTH INFORMATION:

EFFECTS OF OVER EXPOSURE: EYES: Contact with product, product dust or product solution will cause severe burns;possible permanent tissue damage and possible blindness.

SKIN: Contact with product, product dust or product solution will cause severe irritation, possible chemical burns and possible permanent tissue damage.

INHALATION: Inhalation of dust or mist will cause severe irritation and possible permanent damage to upper respiratory tract.

INGESTION: Severe irritation, possible permanent damage to gastrointestinal tract.

MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED: None known

FIRST AID: EYES: Speed is essential. Immediately begin flushing eyes with large volumes of water. Continue for at least 15 minutes. Hold lids apart to assure contact with all surfaces. Obtain medical attention.

SKIN: Flush affected area with large volumes of water. If irritation is evident or blistering occurs, obtain medical attention.

INHALATION: Remove to fresh air. Administer oxygen if breathing is difficult. Obtain medical attention if irritation persists.

INGESTION: Do not induce vomiting. If victim is conscious, dilute by giving large volumes of milk of water. Obtain immediate medical attention. Never attempt to give anything by mouth to an unconscious person.

PRIMARY ROUTES OF ENTRY: INHALATION X SKIN CONTACT X OTHER MSDS # I2556

SECTION VI — REACTIVITY DATA:

STABILITY: STABLE X UNSTABLE _____ HAZARDOUS POLYMERIZATION WILL NOT OCCUR

CONDITIONS TO AVOID:

Contact with strong alkalies, reactive metals, organic materials

HAZARDOUS DECOMPOSITION PRODUCTS:

None

SECTION VII — SPILL, LEAK AND DISPOSAL PROCEDURE:

SPILL OR RELEASE PROCEDURE: CONCENTRATE: Cleanup personnel should use appropriate protective equipment. Shovel dry spill into DOT-approved drums for disposal. Keep spill dry until as much as possible has been swept up and shoveled into disposal drums. Residual amounts should be dissolved in water and solution collected in DOT-approved drums for disposal. Area may be neutralized with soda ash solution. Do not allow product or rinse water from spill to enter sewer or waterways.

USE SOLUTION: Confine spill. Stop leak at source if this can be done safely. Ventilate area. Evacuate nonessential personnel. Pump liquid into DOT-approved drums for disposal. Absorb remaining liquid onto inert absorbent and place in DOT-approved drums for disposal. Wash area with water and neutralize with soda ash solution. Collect washings and place in DOT-approved drums. Keep spill and washings from entering sewer or waterways.

DISPOSAL INFORMATION: CONCENTRATE: (1) Transfer to reclaiming center for recycling or reuse, if possible. (2) Transfer to licensed hazardous waste treatment or disposal site for disposition under applicable local, state and regional regulations as hazardous waste.

SPENT SOLUTION AND RINSES: Dispose as (1) or (2) above, or heavy metals may be precipitated by pH adjustment to 9.5-10.5. The pH of the separated water should then be readjusted to pH 7.0-8.0. Any residual organic matter may be removed by oxidation and/or carbon treatment. Clarified water may be released to sewer if local regulations permit.

SECTION VIII — SPECIAL PROTECTION INFORMATION:

RESPIRATORY PROTECTION: For dust or mist conditions, a NIOSH-approved respirator for dust and mists is advised. If respirators are used, a formal training and screening program must be initiated. See 29 CFR 1910-134.

VENTILATION: Maintain sufficient mechanical ventilation to keep particulate concentration below TLV.

PROTECTIVE EQUIPMENT: CHEMICAL FACE SHIELD OR GOGGLES: X

GLOVES X BOOTS X APRON X PROTECTIVE SUIT Not normally required

GLOVES, BOOTS, APRON AND SUIT MADE FROM: Acid resistant neoprene

RECOMMENDED PERSONAL HYGIENE: Wash hands and face with soap and water before smoking or eating. Immediately remove all contaminated clothing. Launder before reuse. Do not launder at home. Discard contaminated shoes.

SECTION IX — OTHER INFORMATION:

SPECIAL PRECAUTIONS — STORAGE AND HANDLING: Store in dry protected area.

MIXING: Add slowly to tepid water while mixing. Never dump large amounts into water. Add only as fast as product dissolves. Make additions to in-use tank slowly and cautiously preferably pre-dissolved in water.

REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT: Relieve any pressure. Cover openings to avoid splashing. Clean exterior and interior by flushing with water. Collect flushings for disposal. Use protective equipment for eyes, skin and inhalation.

DATE PREPARED: JD 11/22/85 DATE REVIEWED:

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved OMB No. 44-R1367

MATERIAL SAFETY DATA SHEET MSDS #13335

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Turco Products, Inc.	(213)634-3300
ADDRESS (Number, Street, City, State, and ZIP Code) 24600 South Main Street, Carson, Ca 90749	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Turco Contam-Affix
CHEMICAL FAMILY	FORMULA

SECTION II - HAZARDOUS INGREDIENTS
HAZARDOUS MIXTURES OF LIQUIDS, SOLIDS, OR GASES

	C.A.S. NUMBER	EPA RQ SPILL CAT.	EPA WASTE NUMBER	%	TLV UNITS
Toluene	108-88-3	C	U220	25	100PPM
n-Butyl alcohol	71-36-3	Un-listed	U031	5	50PPM
Isopropyl alcohol	67-63-3	Un-listed	D001	30	400PPM
Acetone	67-64-1	Un-listed	U002	20	100PPM

Other components not defined as hazardous by US Dept. of Labor

Carcinogens per OSHR 5/3/73 — none

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	133°	-243°F	SPECIFIC GRAVITY (H_2O=1)		0.86
VAPOR PRESSURE (mm Hg.)	Approx.	185mm	PERCENT, VOLATILE BY VOLUME (%)		85%
VAPOR DENSITY (AIR=1)	Over	1	EVAPORATION RATE (BU.AC. =1)	Over	1
SOLUBILITY IN WATER		Slight			
APPEARANCE AND ODOR	Dark brown-orange liquid, Ketone odor				

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
23°F Setaflash			

EXTINGUISHING MEDIA
Carbon dioxide, dry chemical, foam

SPECIAL FIRE FIGHTING PROCEDURES
None

UNUSUAL FIRE AND EXPLOSION HAZARDS
None

dg Revised: 5/83 new (Continued on reverse side) Reviewed: Reviewed:

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VI

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SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section II

EFFECTS OF OVEREXPOSURE: Inhalation: Headache, nose and throat irritation. Skin contact: Skin defatting. May be absorbed through skin in toxic amounts. Eyes: Severe irritation may cause permanent damage.

EMERGENCY AND FIRST AID PROCEDURES: Inhalation: Remove to fresh air. If breathing is difficult administer oxygen. If breathing has stopped apply artificial respiration. Obtain medical attention. Eyes: Flush eyes with large volumes of water for 15 minutes. Obtain medical attention. Skin: Remove contaminated clothing, launder before reuse. Wash affected skin area with soap and water. If irritation persists or blistering occurs obtain medical attention. Ingestion: DO NOT induce vomiting. Dilute by giving large volumes of milk or water. Obtain medical att. immediately. Transport to hospital as soon as possible.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (Materials to avoid)
Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS
Toxic oxides of carbon and nitrogen, carbon monoxide

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Contain spillage. Ventilate area. Wipe up or absorb spillage onto absorbent material. Recover in drums for disposal.

WASTE DISPOSAL METHOD
1. Landfill under applicable local, State and regional regulations
2. Burn in a chemical furnace with appropriate fume scrubbing system.
3. Transfer to reclaiming center for solvent recovery.

SECTION VIII-SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type): If TLV is exceeded a self-contained breathing apparatus, positive pressure hose mask or air-line mask is advised. These should have a full face piece and be operated in pressure demand or other positive pressure mode. For exposure of no more than 30 min. in areas of good ventilation, a full face mask with an organic vapor canister may be used. These should be checked often and then canister replaced regularly. These must not be used in partly enclosed or low lying areas, such as tanks or sumps, or for emergency use.

VENTILATION — LOCAL EXHAUST: X — SPECIAL:
MECHANICAL: — OTHER:

PROTECTIVE GLOVES: Solvent resistant (neoprene) — EYE PROTECTION: Well fitting cup type or rubber framed goggles

OTHER PROTECTIVE EQUIPMENT: Solvent resistant boots and apron (neoprene)

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Use care in opening drums to avoid spurting of contents.

OTHER PRECAUTIONS: Vapors from this product are heavier than air and will travel along the ground to collect in low lying areas, such as sumps. Personnel entering such areas must be provided with respiratory protection and a safety line. They should be kept under observation while in the area by another man at a safe distance.

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MSDS #12553

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved OMB No. 44-R1367

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Turco Products, Inc.	(213)634-3300
ADDRESS (Number, Street, City, State, and ZIP Code) 24600 South Main Street, Carson, Ca 90749	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS Turco 5931-C
CHEMICAL FAMILY	FORMULA

SECTION II - HAZARDOUS INGREDIENTS
HAZARDOUS MIXTURES OF LIQUIDS, SOLIDS, OR GASES

	C.A.S. NUMBER	DOT SPILL CAT.	EPA WASTE NUMBER	%	TLV UNITS
2-Butoxy ethanol	111-76-2	Un-listed	Un-listed	< 1	50PPM
Dioctyl phthalate	111-81-7	Un-listed	U107	< 1	5mg/m^3
Morpholine	110-91-8	Un-listed	Un-listed	<1	20PPM
Mineral oil	T.M. List	Un-listed	Un-listed	< 1	5mg/m^3

Other components not defined as hazardous by US Dept. of Labor

Carcinogens per OSHR, 5/3/73 None

SECTION III - PHYSICAL DATA

BOILING POINT (°F.) Approx.	212°F	SPECIFIC GRAVITY (H_2O=1)	1.05
VAPOR PRESSURE (mm Hg.) Approx.	20mm	PERCENT, VOLATILE BY VOLUME (%)	60%
VAPOR DENSITY (AIR=1) Over	1	EVAPORATION RATE (BU. AC. = 1) Less than	1
SOLUBILITY IN WATER	Complete		
APPEARANCE AND ODOR Opaque liquid			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	LEL	UEL
NA	unknown		

EXTINGUISHING MEDIA
Water, carbon dioxide, foam

SPECIAL FIRE FIGHTING PROCEDURES
None

UNUSUAL FIRE AND EXPLOSION HAZARDS
None

dg 5931-9

Reviewed: 6/82

MSDS #12553

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section II
EFFECTS OF OVEREXPOSURE: Skin: Defatting, minor irritation. Eyes: Non-permanent irritation. Inhalation: Irritation, nausea. Ingestion: Gastric disturbances, nausea.
EMERGENCY AND FIRST AID PROCEDURES: Skin: Wash with water. Remove contaminated clothing. Launder before reuse. Eyes: Flush with water or 1% boric acid. Obtain medical attention, if irritation persists. Inhalation: Remove to fresh air. Ingestion: Do not induce vomiting. If conscious, dilute by giving large volumes of milk or water. Never attempt to give anything by mouth to an unconscious person. Obtain medical attention.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Confine spills by sandbags or absorb on suitable materials (rags, sawdust, sweeping compounds). Collect spills in sealable containers.

WASTE DISPOSAL METHOD
Neutralize and separate floatable grease and oil for incineration or disposal in approved landfill. Release neutralized waters to sewer in accordance with Federal, State, and local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
Respirator with mechanical filter for mist or dust conditions

VENTILATION	LOCAL EXHAUST X	SPECIAL
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES Rubber	EYE PROTECTION Chemical goggles

OTHER PROTECTIVE EQUIPMENT
Rubber boots and apron

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store in closed containers away from excessive heat or direct sunlight.

OTHER PRECAUTIONS
None

dg
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GPO 934-018

Form OSHA-20
Rev. May 72

Form Approved
Budget Bureau No. 44-R1387
Approval Expires April 30, 1971

U.S. DEPARTMENT OF LABOR

Form No. LSB-005-4
May 1969

WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

MSDS # 13365

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: West Chemical Products, Inc.	EMERGENCY TELEPHONE NO.: 212 784-2424
ADDRESS (Number, Street, City, State, and ZIP Code): 42-16 West Street, Long Island City, N.Y. 11101	
CHEMICAL NAME AND SYNONYMS: NA	TRADE NAME AND SYNONYMS: WEDAC
CHEMICAL FAMILY: Acid Cleaner-Deruster	FORMULA: NA

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS: NA			BASE METAL: NA		
CATALYST: NA			ALLOYS: NA		
VEHICLE: NA			METALLIC COATINGS: NA		
SOLVENTS: NA			FILLER METAL PLUS COATING OR CORE FLUX: NA		
ADDITIVES: NA			OTHERS: NA		
OTHERS: NA					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Phosphoric Acid	561	mg/M³

SECTION III PHYSICAL DATA

BOILING POINT (°F.): over 212		SPECIFIC GRAVITY (H_2O=1):	1.40
VAPOR PRESSURE (mm Hg.):	NA	PERCENT VOLATILE BY VOLUME (%):	33-35%
VAPOR DENSITY (AIR=1):	NA	EVAPORATION RATE (_____=1):	NA
SOLUBILITY IN WATER:	complete		
APPEARANCE AND ODOR: Light amber liquid - mild odor			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): None (COC)	FLAMMABLE LIMITS	Lel: NA	Uel: NA
EXTINGUISHING MEDIA: NA			
SPECIAL FIRE FIGHTING PROCEDURES: NA			
UNUSUAL FIRE AND EXPLOSION HAZARDS: Material in contact with active metals can liberate Hydrogen			

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SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: Unknown

EFFECTS OF OVEREXPOSURE: Can be irritating to skin and mucous membranes

EMERGENCY AND FIRST AID PROCEDURES:
Skin - wash with soap and water
Eyes: Flush with water for 15 minutes. Consult physician
Internal: Give milk or milk of magnesia & plenty of water. Call physici

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	Avoid contact with alkalies and chlorine

INCOMPATABILITY (Materials to avoid): Incompatible with alkaline materials

HAZARDOUS DECOMPOSITION PRODUCTS: NA

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	NA

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Rinse with water

WASTE DISPOSAL METHOD:
Flush down drain

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type): NA

VENTILATION	LOCAL EXHAUST	X	SPECIAL: Use in ventilated area
	MECHANICAL (General)	X	OTHER

PROTECTIVE GLOVES: Rubber or polyethylene

EYE PROTECTION: Safety goggles or face shield

OTHER PROTECTIVE EQUIPMENT: Rubber or polyethylene apparel as required

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store away from strong alkalies

OTHER PRECAUTIONS: NA

DISTRIBUTION SHEET

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233-S Facility Potential Chemical Hazards, WHC-SD-DD-TI-056 Rev. 1		ECN No. 167444

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